Emerald

Technical Guide
Version 2.5

Emerald Management Suite

IEA Software, Inc.

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Credits

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Preface

The Emerald Management Suite Technical Guide is designed to provide both high level and technical information for someone administering Emerald.

This technical manual complements the Emerald User's guide. Certain parts will assume you have read and understand the User's guide.

Although working knowledge of SQL Server will aid in understanding some portions of this document, it is not required for the most part. We highly recommend reading of the Microsoft SQL Server Administrator's Companion documentation that comes with Microsoft SQL Server. This documentation provides much information on installing and maintaining SQL Server.

1. Database Management

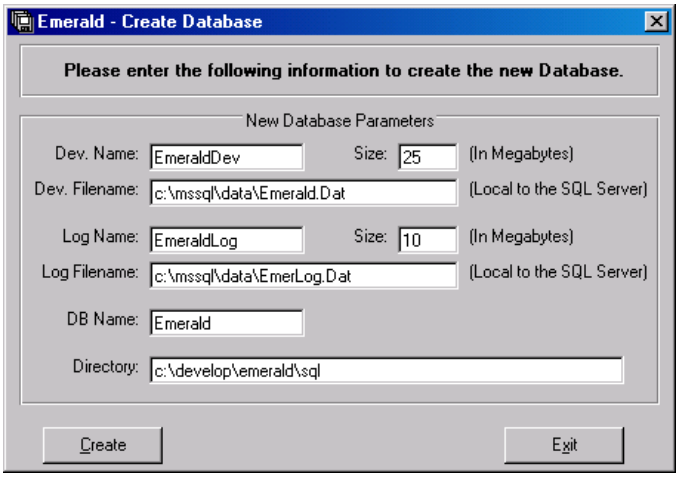
After the client and administrator programs are installed onto your computer (as well as the SQL Client utilities) you will need to use the Emerald Administrator to create the database on your SQL Server. We have gone through great strides to make this step as easy as possible, and only requiring a minimal amount of SQL Server knowledge.

Create Database

Before you can use the Emerald client or configure Emerald, it is necessary to create the Emerald database. The Emerald database is where all of your information will be stored. Run the Emerald administrator by selecting it from the program group that was created during the installation process. When you are prompted to login, make sure you login as the *System Administrator* account "sa". The server should be the name of your server, and you should select the master database as pictured below. If you do not know the SA password, you may have to consult with your SQL Server administrator. For a fresh SQL Server installation, the SA password is blank by default.

Once the Emerald Administrator is started, from the Database pull down menu, select the Create option. If you choose the master database as in the example above, Emerald will automatically open the create database window to let you create the database.

This will bring up the Create database window. Most of the options are sufficient for a beginning Emerald database of 500 MBRs. However, if you will be importing a larger number of users you may need to enlarge these numbers. See the table below for an explanation of each field.



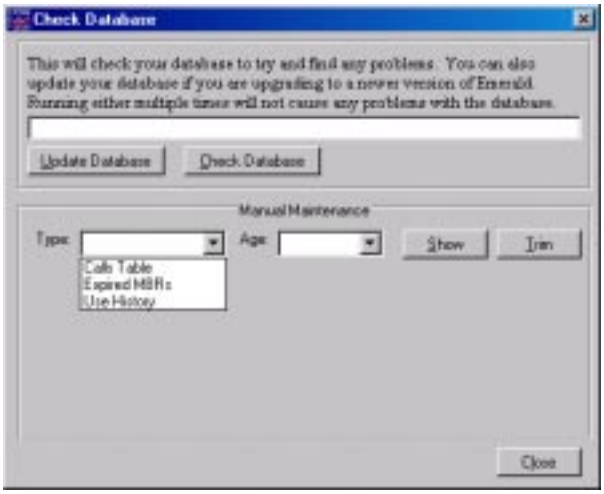
Field	Description
Dev. Name	The name of the Emerald Database Device that will hold the data portion of the database. This is usually EmeraldDev.
Size	Size of the data Database Device. As a general rule of thumb you will need about 100mb per 1000 MBRs. However, this can greatly vary based on the actual usage of Emerald and the amount of history retained in the database.
Dev. Filename	The physical filename of the data Database Device. This path is *local* to the SQL Server and must already exist (except for the file itself). You should check your SQL Server installation to verify this path.
Log Name	The name of the Emerald Database Device that will hold the log portion of the database. This is usually EmeraldLog.
Size	Size of the log Database Device. As a general rule of thumb you will need the log to be about 1/5 of the size of your data Database device. Therefore, if you EmeraldDev is 100mb, your log should be 20mb.
Log Filename	The physical filename of the log Database Device. This path is *local* to the SQL Server and must already exist (except for the file itself). You should check your SQL Server installation to verify this path.
DB Name	This is the actual Database name that will be created. The Database must not exist. This is usually Emerald.
Directory	This is the path where the Emerald SQL scripts are located. In most situations you should leave this blank, and the Emerald administrator will look in the current working directory. If you receive an error about not being able to find a file, you will need to specify the exact path to the SQL scripts included in the Emerald distribution.

Once you select the create button, the Emerald Administrator will attempt to create the database. If a problem occurs, you will be notified of what the problem is. Otherwise, you will see the steps at the bottom of the window, eventually followed by a message telling you the Emerald database was created successfully.

After your database is created, you may continue on to configuring Emerald. It is not necessary to perform a check or update on a new database.

Check Database

Although SQL Server has many built in functions to manage database integrity, at times you may need to manually check your Emerald database. If you decide to check the Emerald database, you should perform the check at a time where database usage is at a minimum. While the database check is occurring, SQL Server will need to lock tables, which could temporarily prohibit other processes from using the database (like other Emerald clients or RadiusNT).



Another option with the check database is to do database maintenance, which includes updating your database if you are upgrading from an older version of Emerald, or trimming old records out of tables.

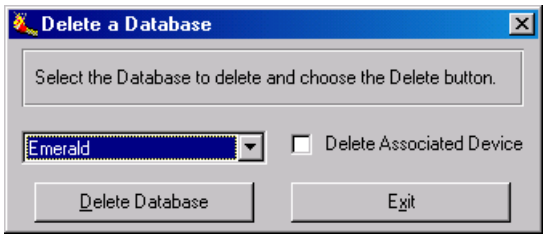
The Update and Check database buttons run scripts that were included with the Emerald distribution. Update runs the insttabs.sql, instproc.sql, and updttabs.sql scripts. Check runs the checkdb.sql script. Although running the update option multiple times should not cause any problems, it is only recommended that you execute it once per major/minor upgrade if requested to in the release notes for that version or revision.

The manual maintenance allows you to run procedures to clean up old information in your database. This is not required, but is very helpful to keep the size of your database down. The Calls table option will allow you to clean up old records. This is typically handled by the batch consolidation, but in some cases the records may not be removed. The Expired MBRs allows you to remove MBRs that have expired. This is generally not needed unless you have a high number of old records in your database. Finally, the usage history is designed to trim out old historical information. This is rarely needed, since the historical records are summary records and do not take up a lot of room.

Delete Database

In the event you would like to delete you Emerald database, you can use the Delete option from the Database pull down menu to remove your Emerald database. You must re-start the Emerald administrator before re-creating a database.

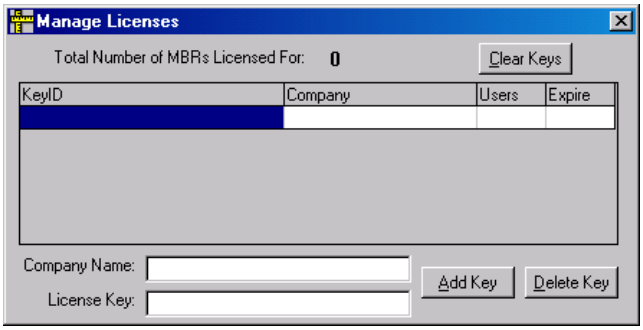
If you check the Delete Associated Device option, the SQL Server will delete the database devices as well. SQL Server does NOT delete your data and log physical files, though. You will need to manually delete the physical file after deleting you database. You will not be able to re-create a database with the same device names until you remove the physical files.



2. Licensing

Once you have successfully created your Emerald database, you should install your license into the database. If you later choose to update your license information (for example add more MBRs) you will select this option as well.

Select Licensing from the File pull down menu or choose the License button from the tool bar. The Licenses window will open up and show you the current license information.



Adding a License

When you purchase Emerald, Evaluate Emerald, or add additional MBRs, you will receive an E-mail with your License information. You need to enter the *exact* Company Name and License Key that you receive in the E-mail. The best way to copy the information is to cut and paste it from your mail package. This will insure that you do not enter the wrong information into the license manager.

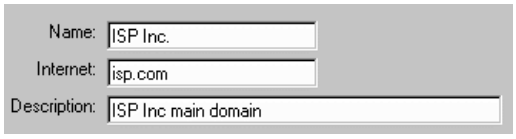
If you have an expired key in your database, Emerald will not run. If you have an Evaluation key and receive your permanent key, you should delete the evaluation key before installing your permanent key. You can use the clear keys button to clear all keys from your database.

3. General Configuration

The General Configuration area of the Emerald administrator is where the basic configuration of Emerald is performed. Most of the selection options in Emerald are based on selections pre-defined in the General and Accounting sections. Therefore, you may need to define or add an option is one place before you can complete another. The below sections describe each tab in the General configuration area.

Domains

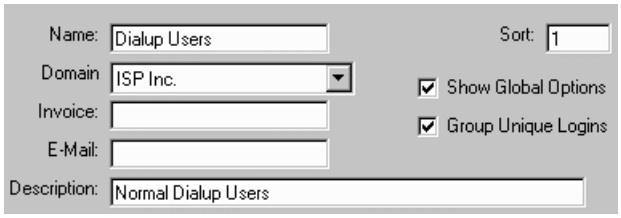
Domains are synonymous with an Internet domain. You should define at least the domain which your organization uses, and may define others. To add a domain, click the Domains tab, then click Add.



The Name of the domain is what Emerald will display for the domain. The Internet field specifies the full Internet domain (for example, iea-software.com). Fill in the description to document the use of the domain or make a note about what it is. Be sure to click the Save button to keep any changes you make. To delete a domain, select the item, click the Delete button.

Billing Groups

Billing Groups are a set of Master Billing Records that have billing in common. They are a way of separating out different options and features between groups of users. When you create an MBR, you must assign a Billing Group to the MBR. The group assigned is very important because the choices of many selections can vary depending on the group. These dependencies are be discussed throughout this section. To define a group, click the Billing Groups tab, then click Add.



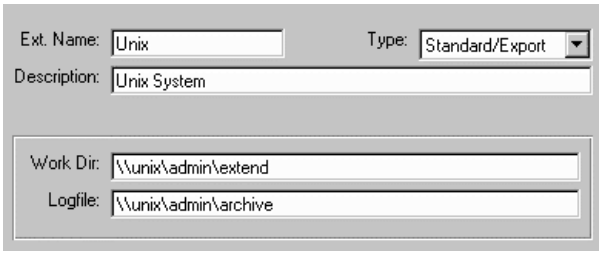
The Name of the group is what Emerald will display for the group. The Domain is an Internet domain that is assigned to the group. Each group has one domain assigned to it. The information in the group's domain will be used for completing e-mail addresses and other Internet information that is not explicitly configured for the user, but rather by default by looking at the assigned domain. Fill in the Description to document the use of the group or make a note about what it is. Be sure to click the Save button to keep any changes you make. To delete a billing group, select the item, click the Delete button.

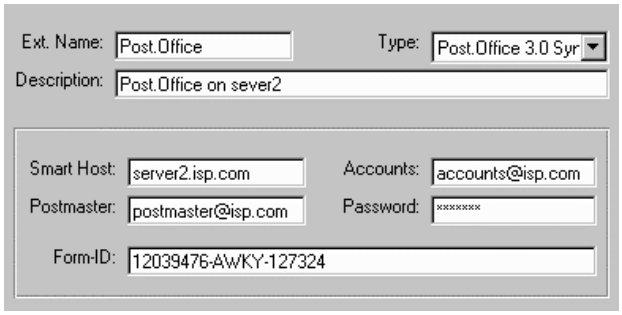
A typical use of groups would be to have three; Dialup, 1-800 and Management. This is the default configuration for Emerald. You can also have other groups as defined by your own specific needs, such as service reselling, or ones for large companies

External Systems

One of the more useful features of Emerald, especially in large or heterogeneous environments is the ability to synchronize user information with other systems besides the Emerald database. The open nature of the Emerald database and the technical specifications of the suite allow many third party applications to easily interact with Emerald. In order to accomplish this interaction, you must define each external system you wish to integrate with and inform Emerald what type it is. Most typical installations of Emerald will not use any external systems, or will just

use the Message Transport Agent (MTA). Some of the more popular external systems include e-mail and authentication. For e-mail, Emerald can synchronize with Post.Office, NTMail, and Netscape, and Mail Site. For authentication, Emerald can synchronize with most versions of UNIX operating systems and the Serv-U FTP server.





To add an external system, click the External Systems tab, then click Add. The Ext. Name is what Emerald will display for the external systems name. When configuring an MTA in the external systems, select which MTA you will be using from the type list. When configuring a standard or export, select Standard/Export from the Type list. Fill in the Description to document the use of the external system or make a note about what it is. Be sure to click the Save button to keep any changes you make. To delete an external system, select the item, click the Delete button.

The External Support chapter has more detailed information on external systems support, and configuring a specific external system.

Regions

Regions are geographical areas that usually indicate different areas where you provide Internet services. Although regions are not functionally used in Emerald, they are designed for reporting or external integration. They may be used for many different grouping purposes, rather than just geographical.

To define a region, click the Regions tab, then click Add. The Name is what Emerald will display for the region name. The Billing Group field is used to tell Emerald which billing group can use this region definition.

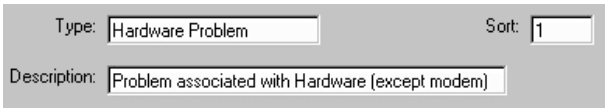
If this is a global region (allowed to be used by any MBR in any group) then select Global for the group. Otherwise, if this region is only allowed to be used by a specific group, select the group from the group list.

Be sure to click the Save button to keep any changes you make. To delete a region, select the item and click the Delete button.

Incident Types

Incident Types allow you to categorize incidents tracked in Emerald. This is especially useful for summaries of incidents so you can pin point specific areas that may need improvement or special attention.

The type is a the short name that will be displayed in the list. The description is a longer description of the actual problem. Although Emerald does not display the description in the client, it is most useful in reports to have the longer description rather than just the name.



Custom Reports

Customer Reports are the key to getting additional or specific information out of Emerald in a way that best suits your needs or requirements.

The name of the report is what will be displayed in the pick list on the Reports tab of the Emerald client. The report file is the actual filename of the report. This file should be located in the global reports path specified in the Client Configuration section.

Sales Persons

Sales Persons allows you to track who sold an account for reporting and tracking purposes.

The administrator can create a list of Sales Persons that will appear in the Sales Persons list when editing a MBR. The user has the choice of choosing a pre-defined Sales Person, or typing in a custom one.

Referrals

Referrals allow you to track who referred an account for reporting and tracking purposes.

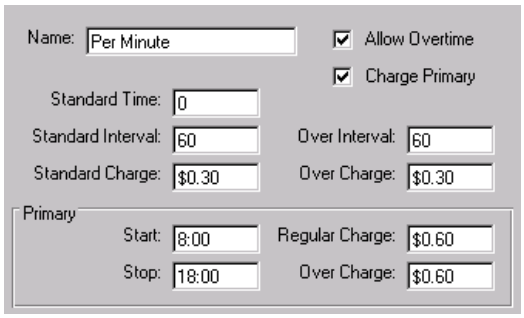
The administrator can create a list of referrals which will appear in the referred by list when editing a MBR. The user has the choice of choosing a pre-defined referral, or typing in a custom one.

4. Accounting Configuration

The Accounting Configuration area of the Emerald administrator is where the specific accounting rules and behavior of Emerald are defined. The below section describes each tab in the Accounting configuration area.

Rates

In order to use the billing feature in Emerald, you will need to setup up the rates at which accounts will be billed. When you define a rate, you are telling Emerald a set of rules to follow when billing a user based on their call usage. The rate information does not include the base charge a user will pay for a service, but defines the charges user will incur while on-line.



To define a rate, click the Rates tab, then click Add. The Name is what Emerald will display for the rate name. When the Allow Overtime checkbox is selected, it activates the charging for overtime usage feature. When the Charge Primary checkbox is selected, it activates the charging for primary time usage feature.

Rates are defined on a two-tier system that allows you to specify a cost for a base amount of time (Standard) and another cost for the amount of time over the base (Primary).

In the Standard Time text box, you can define the number of intervals associated with the base time. You specify the interval (number of seconds) of base time in the Standard Interval text box. For example, if you wanted to bill in one-minute increments you would use 60 and for one-hour increments you would use 3600. The Standard Charge field is used to define the standard rate for the standard time.

The Over Interval and Over Charge are used to define the amount the user will be charged for every interval over the standard allowed.

The Primary text box only appears if you have the Charge Primary checkbox selected. In this area, you can define a primary or peak hours time period, in which the billed amounts can vary depending on whether the user is calling during the defined hours or not. The Start and Stop fields are listed in hour:minute format such as (8:00 for 8am and 18:00 for 6pm). Again, the Regular Charge field is used to define the primary rate for the primary time, while the Over Charge is used to define the amount the user will be charged for every interval over the Standard Time.

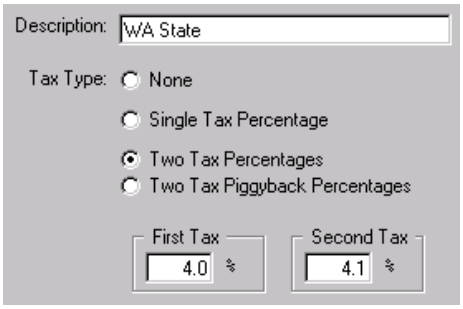
This gives a total of four different configurable amounts for the rates as follows:

- base hours rate
- additional hours rate
- peak hours rate
- off-peak rate

Be sure to click the Save button to keep any changes you make. To delete a rate, select the item and click the Delete button.

Taxes

In order to apply taxes to a Charge or Service, you must first pre-define the Tax. Emerald tracks all Taxes by their unique ID, to allow for easy and powerful reporting of Taxes.

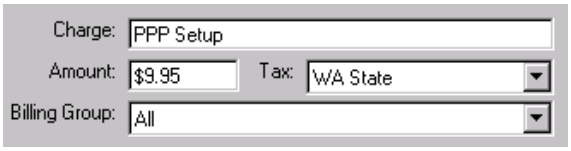


Three types of taxes are supported by Emerald: Single, Dual, and Piggyback. The single tax is a single percent of the item cost. A dual tax is two separate taxes based on the same item cost and are individually tracked and listed on the invoice.

A piggyback tax is two taxes where the first tax is a percent of the item cost and the second tax is a percent of the sum of the item cost and the first tax. Like a dual tax, the piggyback taxes are individually tracked and listed on the invoice.

Charge Types

Use the charge types area to define non-recurring charges that can be manually applied to an MBR or configured as a setup charge for a Service Type. These charges are typically small fees that can be added as a line item to an Invoice or Renewal notice, such as an account setup fee.



To define a charge type, click the Charge Types tab, then click Add. The Name is what Emerald will display for the region name, while the Description field is used to further identify the charge type. The Amount field is used to tell Emerald the cost associated with the charge type, and if the Charge Type has tax associated with it, you can pick a Tax that you previously defined. The Billing Group tells Emerald which billing group can use this charge type definition.

If this charge type is allowed to be used by any MBR in any group, then select Global for the group. Otherwise, if this charge type is only allowed to be used by a specific group, select the group from the group list.

Be sure to click the Save button to keep any changes you make. To delete a charge type, select the item and click the Delete button.

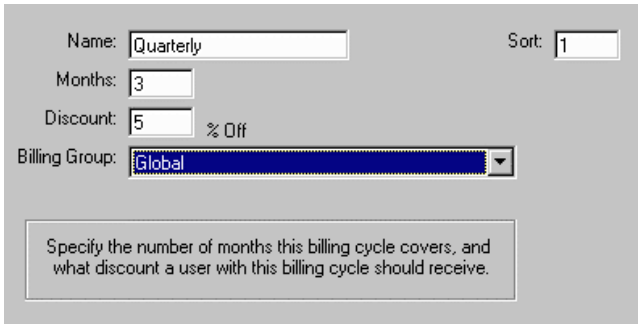
Pay Periods

Payment periods are used to define a payment cycle, or rather a specific number of months. The main purpose of payment periods is to allow you to associate specific discounts to be applied for longer pay periods. Each pay period must have a unique name. It can also be specific to a certain billing group or global to all billing groups (by selecting none).

For example, you may wish to offer a 20% discount on some Services if the user pays for a year in advance. Or, you could also give a user a free month if they pay for five months, by specifying a discount of 16.67%.

Later, when you define a Service, you can specify whether or not that Service will follow the pay period discount you have configured for this pay period. This allows you to have some Services (like dial-up accounts) receive the termed discount, but other Services (like Web hosting) not receive the termed discount.

To define a pay period, click the Pay Periods tab, then click Add. The Name is what Emerald will display for the pay period name. The Months field is used to specify the number of months in the pay period, while the Discount % Off field is where you enter the amount of discount you would like to offer for paying for the term. The discount is entered in decimal format. For example, to offer a 21 and a half percent discount, you would enter 21.5 in the Discount field. The Billing Group field is used to tell Emerald which billing group can use this pay period definition.

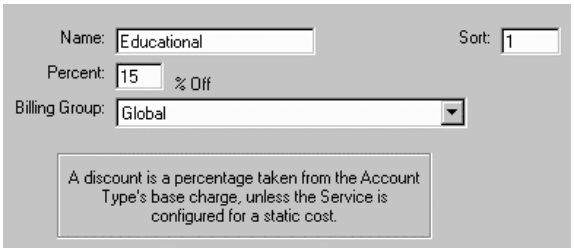


Be sure to click the Save button to keep any changes you make. To delete a pay period, select the item and click the Delete button.

Discounts

The last part of the billing configuration you will define is discounts. Discounts allow you to configure a name and percentage that will be available when defining services. A typical example is an educational discount, in which you might offer an additional 10% discount to educators and students. Later, when configuring the Service for this account in the Emerald client, you would simply select the educational discount from the cost pick list and the defined discount will automatically be applied.

Note that this discount is in addition to the pay period discount listed above and taken after the pay period discount. Therefore if the pay period discount is 20% and the example educational discount is 10%, the result is not 30% off the Service price. The combined discount will be 20% off the Service price, and then 10% off that result (or 28% in this example).



To define a discount, click the Discounts tab, then click Add. The Name is what Emerald will display for the discount name. The Percent off field is where you enter the percent of discount you would like to offer. The percent is entered in decimal format. For example, to offer a 21 and a half percent discount, you would enter 21.5 in the Percent field. The Billing Group field is used to tell Emerald which billing group can use this discount definition.

Be sure to click the Save button to keep any changes you make. To delete a discount, select the item and click the Delete button.

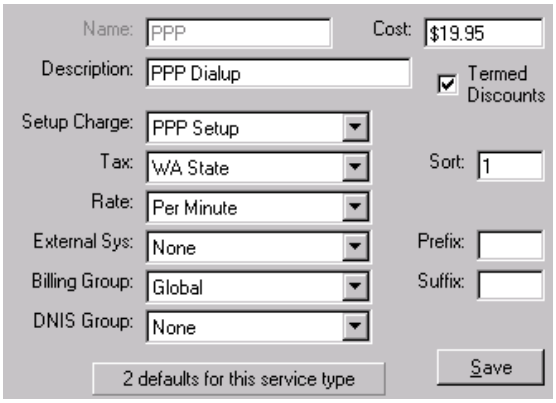
Services

Now that you have configured all of the Service billing parameters, you can configure a Service.

To define a Service, click the Services Types tab, then click Add. The Name is what Emerald will display for the Service name. Fill in the Description to document the use of the Service or make a note about what it is. The description will appear on Invoice line items of Customers who subscribe to this service.

Each Service is given a base rate that the user will be charged regardless of time of usage. This is the monthly recurring charge for the Service, and is defined in the Cost field. You can also specify whether the account will honor pay period discounts by selecting the Termed Discounts checkbox.

If the Service will have a setup charge (it can be manually waived when creating the account) select a Setup Charge from the Setup Charge list. If the Service is a taxable service, then you can select one of the pre-defined Taxes from the Tax list. If the service will not have a setup charge or tax, select None for that list.



You can select a rate for the Service from the Rate list. The rate must have been previously configured before you create the Service. If the Service is to be synchronized with an external system, you can select the appropriate external system from the External Sys list. Otherwise, choose the None option from the list.

If this is a global service (allowed to be used by an MBR in any billing group), then select Global from the Billing Group pick list. Otherwise, if this Service is only allowed for use by a specific billing group, select the billing group for the Service from the Billing Group list.

To enforce DNIS restrictions for the Service, select a pre-defined DNIS group from the DNIS Group list. If the Service will not have DNIS restrictions, select None from the list. Below the DNIS group list, you will see text telling you how many RADIUS default attributes the service type has. If the service type does not have any RADIUS default attributes, any user assigned to the service type will not be able to login until you define a default set of RADIUS Attributes for the service type. Also, in order to delete this service type, you must remove

Be sure to click the Save button to keep any changes you make. To delete a Service Type, select the service type from the list and click the Delete button.

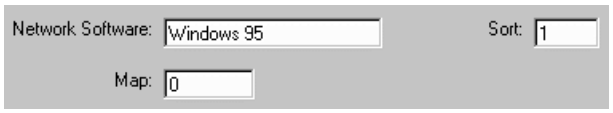
Services also have another significant use. You can specify authentication access per service. This allows you to have finite control over who can use what access service you offer and from where. This will be discussed more in the RadiusNT configuration chapter.

Service Details

When adding a Service to an MBR, you can specify several pieces of information about the Service. This information is most typically used to keep track of information about dial-up user's operating systems, software, and modem speed. The information is useful in reports, and can speed up technical support for that user.

Three tabs allow you to configure this information. The first is System Types, which refers to the operating system of the user's computer.

Next is the Net Software, which specifies the dial-up software they are using. (There is a map option for this, which is used for the Standard/Export external system. Please refer to the External Support chapter for more information on this. If you are not using external systems, you should just leave the map number to 0.)



Lastly, the Modem Speed is simply the speed of the user's modem.

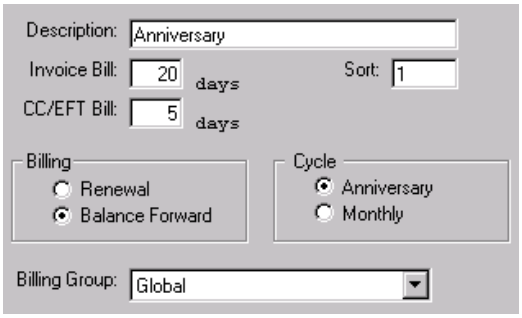
All three of the Service details are informational and not functionally used by Emerald. The information is useful for custom reports created with Crystal Reports.

Be sure to click the Save button to keep any changes you make. To delete a Service detail type, select the item and click the Delete button.

Billing Cycles

Billing Cycles are the key definitions to how you will bill your customers. You can define multiple billing cycles if necessary, however you will typically have only one or two. The main purpose of a Billing Cycle is to define when customers should be billed and what cycle the customer will be billed on. This is not the same thing as the pay period, described earlier. A billing cycle is also equivalent to a one month time period, but not necessarily a real month (i.e. January 20-February 20).

Billing Cycles are only used when you choose the auto bill option on the batch tab. If you are going to manually batch invoices, then the billing cycle information will only be applicable to the creation of the account (specifically the expiration date).



The Description field is what will be displayed in the Emerald Client for this billing cycle. Invoice and CC/EFT days determines how many days in advance the customer should be billed for Invoice or Credit Card/Electronic Funds Transfer, respectively.

The Billing options of Renewal and Balance Forward determine whether the account will be able to carry a negative balance forward. If the Renewal option is checked, the MBR must pay their full balance before being able to login past their expiration date. This is how Emerald 2.2 and lower operated. The Balance forward option allows the MBR to carry a negative balance forward, allowing their account to work as long as their balance is less than the limit set on their MBR.

The Cycle options of Anniversary and Monthly determine what cycle the account will be billed on. For Anniversary, the account will be billed based on the day they signed up. This gives a wide range of expire dates in your system. For Monthly, Emerald will pro-rate a charge to align the user on a month boundary and they will expire on the first of the next month.

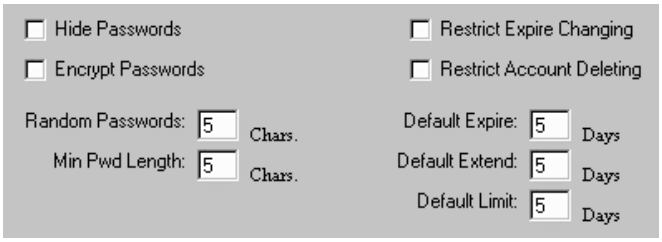
The Billing Group field is used to tell Emerald which billing group can use this billing cycle.

5. Client Configuration

The Client Configuration allows you to configure many options for operators using the Emerald client. Although each user can have local preferences they set, these options are global and apply to the behavior of their client. In most cases these settings are not modifiable by the operator themselves.

Client

When Emerald Operators are using Emerald, you can specify certain visual and data restrictions. If you do not want the operators to be able to see the clear text password of users, check the Hide Password check box. Passwords will be displayed as asterisks.



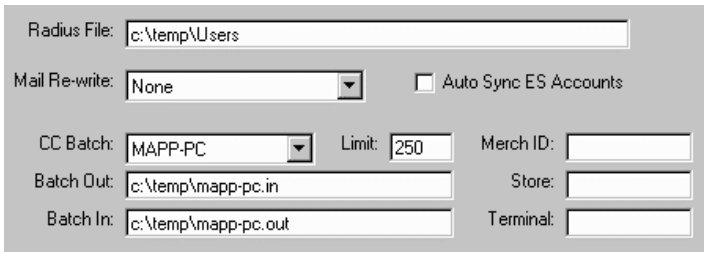
You can enable using encrypted passwords in the Emerald database if you have RadiusNT configured to use encrypted passwords as well. However, you can not use CHAP authentication with this, and it is not a recommended option to enable.

You can specify a random password length when an account is crated and the minimum length for a password, although blank passwords are allowed if the login and shell fields are also blank. Restrict Expire Changing and Restrict Account Deletion prevent a normal operator from changing a users MBR expire date or deleting an MBR.

The default settings allow you to set the default for the expiration of a new MBR. Default expire determines how many days from the current date the expiration field will be. Default extend and default limit set the respective fields for the MBR. Both of these fields are added to the default expiration to make up the expiration date RadiusNT will use for authentication.

External

Emerald can create a standard RADIUS users file, for use with RadiusNT or another RADIUS authentication server. You can specify the full path of the users file to be created in the Radius File text box.



If you are using automatic CC batch processing, you can select from one of many formats Emerald supports. Select the format from the CC Batch Format list, and then specify the input and output filenames to/from your CC processing system. If there is a limit to the number of records your system can process in one batch, you can specify the maximum number of records to batch out at one time in the Batch Limit field.

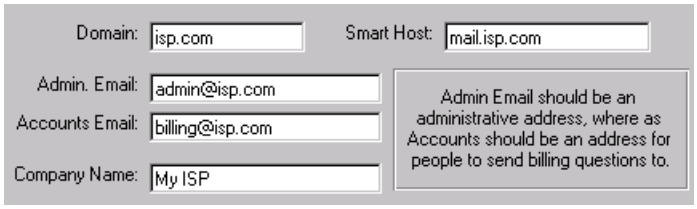
FTP

If you are using a directly supported FTP server (like Serv-U) then you can specify several attributes about each user. To limit the amount of data a user can store in their directory, modify the Size Limit field. You can also restrict users from created sub-directories by UN-checking the Allow users to make directories checkbox.

If you want Emerald to create a directory for a user when you create a service, you can specify the base directory for users. Typically this is a directory in UNC like \\server\users or it can be a relative path for the FTP server like D:\users (although this is not recommended, since Emerald must be running on that machine to manage the directory). Emerald will append a \username by default to this directory.

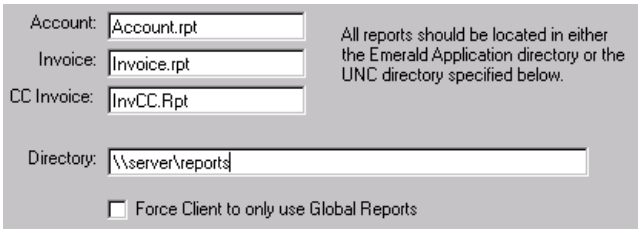
SMTP

The Emerald client has a built in SMTP client to send invoices and mail other information. In order for those to work correctly, you need to specify your domain name, mail server, and Email address of your administrative account. The Admin Email field should be an administrative address, whereas the Accounts Email field will be the From: line of all invoices and other mailings sent to users. The Company Name will be used to create the Subject line of invoices Emailed to customers. The Smart host is the Email server that will be used for all Emails set out.



Reports

Three standard reports are used by Emerald to print out MBR summaries and Invoices. This screen allows you to define the system default filenames for these reports (they can be overridden on a per-group basis as well). You can specify a directory where these reports, as well as all of the custom reports, located. It is best to use a network path (UNC) for the reports directory that all Emerald users will have access to. This information can be overwritten by the local preferences of the Emerald Client on a per-user basis, unless you check the option “force clients to use global reports”.

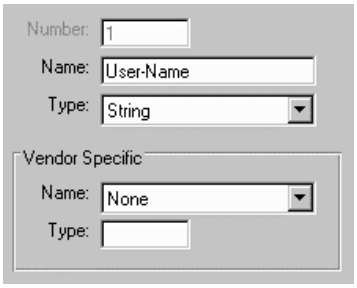


6. RadiusNT Configuration

Most of the configuration of RadiusNT itself is handled in the RadiusNT administrator and set on a per machine basis. However, RadiusNT loads much of its run-time configuration from the Emerald database once it connects to it. The following configuration options may be dependent on enabling features in the RadiusNT administrator.

It is recommended that you be familiar with the RADIUS protocol as it pertains to your NAS (terminal server) when going through this section, since the options will vary depending on the NAS itself.

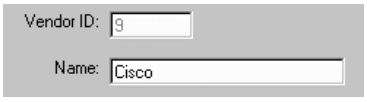
Attributes



This is the set of RADIUS attributes and values commonly known as a dictionary. The purpose of the dictionary is to translate and define the RADIUS numerical information into human understandable descriptions. Emerald comes with a standard set of RADIUS attributes which should work from most Network Access Servers (NAS) vendors. If your NAS requires a change or additional attributes, you can add or delete the list of attributes as needed. Please consult from NAS documentation for information on supported attributes.

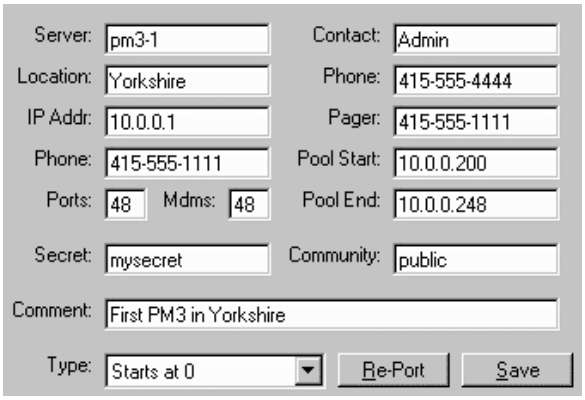
Attribute Vendors

Attribute Vendors are where you define information about Vendors who will have Vendor Specific Attributes.



You should consult your NAS documentation to find out whether it has support for attribute #26 Vendor-Specific. if it does, the documentation should include the Vendor's ID.

Servers



Each Network Access Server (NAS) that will interact with Emerald must be defined. There are only four fields required about the NAS. All other fields are optional/informational. You should fill in the location for the On-line list to work correctly.

Fill in the Name field with the name of the NAS. This can be either the fully qualified domain name (FQDN) of the NAS, or just the hostname of the NAS. Fill in the IP Address field with IP address of the NAS. The Secret should be the shared secret between the NAS and RadiusNT. This must be exactly the same as configured on the NAS itself. The Ports field should be the number of ports (Digital and/or Async) in the NAS. This number can vary greatly depending on the type of NAS.

Here are some common NAS vendors and configurations:

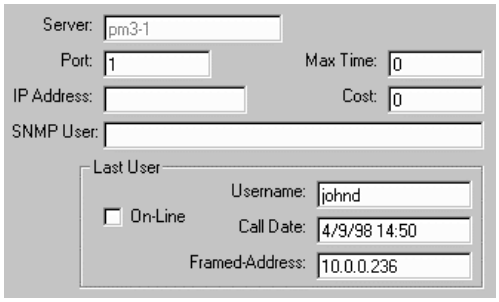
Vendor	Model	Ports	Type
Livingston	Portmaster 2	30	Starts at 0
Livingston	Portmaster 3	24/48	Starts at 0
Ascend	MAX 1800	16	Ascend MAX 1800
Ascend	MAX 400x	48/72	Ascend MAX 4000
Computone	IS/PR	32/64	Starts at 0
USR	TC/HA	48	Starts at 0

The re-port button is used if you need to change the number of ports that a server has. For example, you have an a second PRI to a MAX 4000 which originally only had one, you should change the number of ports from 24 to 48 and then re-port the server. You can verify the server has the correct number of ports using the Server Ports tab (see below).

When you save a server, you will be prompted as to whether Emerald should create the ports for this server or not. In all cases, except for machines running the radlogin program, you should select yes. Make sure you have the ports and type correct before saving the server and selecting yes to create the ports.

Server Ports

In order for Emerald to track who is on-line and control login permissions, it needs to know about each port of each server. By default these are created when you create the server. You can also modify specific information about each port as well. Most of the information about the port should not be changed.



The Port field must match what the NAS will return in the NAS-Port attribute for accounting requests. You can run RadiusNT in –x15 debug mode to see an example of these. The IPAddress field is currently not used.

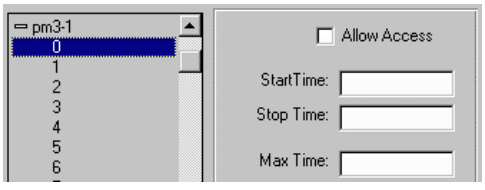
Max Time is the maximum number of seconds a user can be on this port (Session-Timeout). If a Session-Timeout attribute is included in either the Service defaults or user specific set of attributes, the lesser of it and the max time value will be used.

The cost field allows you to set a per-minute cost (in cents) for this field. This can be very useful for toll lines (i.e. 800 numbers) where you will need to charge the customer on a per-minute basis for usage.

The last user information is for tracking concurrency control. You will not need to change the information in there, and can alternately use the clear call button in the Emerald Client Online screen to clear a port that is incorrect rather than running the Administrator.

Server Port Access

Server Port Access is one of two optional features of Emerald that you can use to restrict access to specific Service types. If you have different service offerings (ISDN, 56k, or toll servers), then you can use this option to prevent unauthorized service use. In order for Server Port Access to work, you must enable this option in the RadiusNT administrator on each of your RadiusNT servers.



To specify Server Port Access, you need to select a Service on the left. Once you have select a service, you will be presented with all the Servers you have configured. To specify that a service type can

access a port, select the Server and then select the port. You can then check the Allow Access option, and alternately specify start/stop time restrictions and the maximum time the service can have for a single session. The start and Stop times should be specified in hour:minute format (i.e. 8:00 for 8am and 22:00 for 10pm). The max time field should be in minutes.

If you select the server itself rather than a specific port, you can change values for all ports of that server. This is much faster and easier than having to change each port individually.

Roam Servers

Roam servers are other RadiusNT or RADIUS compatible servers that Emerald can forward requests to. Defining a Roam server is very similar to adding a Server to Emerald, because Emerald in fact has to communicate with it from the Client perspective. You will need to coordinate with the administrator of the server you are forwarding the request to, in order to insure the shared secret is the same.

The server field is the name of the server Emerald will be forwarding the request to. IP Address is the actual IP Address of the server, and secret is the shared RADIUS secret.

Strip Domain tells RadiusNT to remove the domain before forwarding the request. You should consult the administrator of the server you are forwarding the request to, as to whether they would like the domain intact or removed.

The Treat as Local flag actually tells Emerald that this server will not be receiving requests, and that Emerald should process the request locally. This is a very handy option to define for your own domains (see the next section on defining roam domains) so that users who log in with your domains will be authenticated locally rather than forwarded.

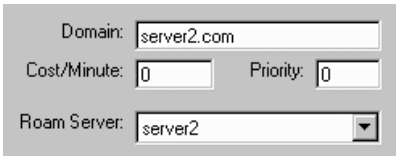
Auth Port and Acct Port is the port RadiusNT will forward the Authentication and Accounting requests to, respectively. Usually this will be the default 1645 and 1646 port numbers, although the administrator of the server receiving the request may want you to send them to a different set of ports.

RadiusNT currently does not support Timeout, Retries, and Allow RLogin.

Roam Domains

Roam Domains is where you actually define the domains that will be forwarded. A domain consists of the @ character followed by one or more words separated by a period. Emerald itself does not enforce any restrictions or limits (beyond size) of the format of the domain except for starting with the @ character.

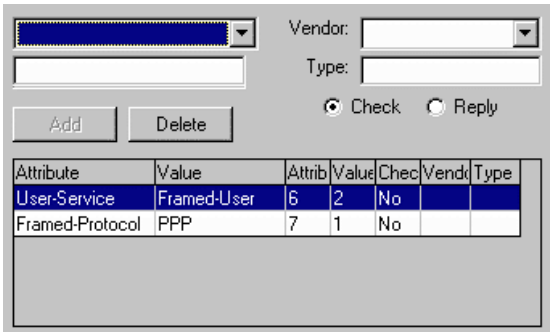
To find out more detailed information about Roaming , please see Chapter 9 as well as the RadiusNT Administrators guide.



The Domain field is the actual domain the user will appended to their user name, without the @ character. Cost/Minute is the cost per minute for this user (for external charge back support). You can define more than one entry for a domain, each having a different priority. This allows you to have a backup server for a domain. The Roam Server field should be one of the Roam Servers to forward the request to.

Service Defaults

In order for a service to be able to login, it must either have a default set of RADIUS attributes, or have a specific set of RADIUS attributes only for that user. This is where you can create a set of default attributes for each service type. These attributes will be sent for any service that has the matching type.



The upper-left list has all the RADIUS attributes that have been defined in Emerald. Based on the type of the attribute, you will get either a values list below the attribute list or a text box, when you select an attribute.

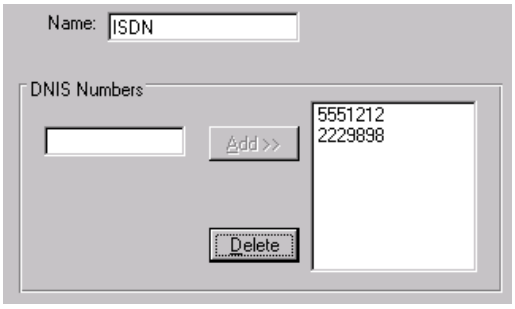
When you are adding an attribute, you must specify whether the attribute is a check attribute or a reply attribute. A check attribute is verified against the attributes in the RADIUS request received from the terminal server. If the value you set does not match the value for the attribute in the request, the user's authentication request will be rejected. For example, you could include Caller-ID, NAS-Port-Type or NAS-Port-DNIS as check attributes to restrict the customer to a specific phone number, port type or DNIS phone number.

Unlike check attributes which are not sent back to the terminal server in the accept packet, the reply attributes are sent back to the terminal server if the authentication is successful. Certain attributes are designed to be check attributes, while others are designed to be reply attributes. See the RadiusNT documentation for details on each RADIUS attribute and the type of it.

Note: *The Username and Password RADIUS attributes should not be specified here. RadiusNT automatically checks and verified these attributes (as well as several other) from MBR and Service fields.*

DNIS Groups

DNIS Groups allow you to define a set of phone numbers the user is allowed to call into. This is not the same thing as Caller-ID (the phone number the user called from). This feature is only available if your terminal server returns the DNIS number in the authenticate request to RadiusNT.



There are three steps to using DNIS groups. The first step is to create the DNIS group itself. Once the DNIS group is created you can then assign one or more DNIS Numbers to that DNIS group. Finally, you must select a DNIS group for each service type that should be restricted to only calling into the DNIS numbers for that DNIS group.

When RadiusNT receives an Authentication request and DNIS groups are enabled, it will see if the NAS-Port-DNIS field matches one of the DNIS phone numbers for the user's DNIS group. If the DNIS number is not in the DNIS group, it will reject the authentication request. If the terminal server does not include a NAS-Port-DNIS attribute in the authentication request, RadiusNT will not enforce the DNIS restrictions.

7. Security Configuration

Emerald relies on the security model of SQL Server to enforce security restrictions, rather than enforcing them at the application level. Because of this, it is not possible for someone to circumvent the security by using another application like isql.

The basic security layout is based on two types of groups. The first is the Billing groups, that each MBR must belong to one and only one of. The second is the Operator groups, that each operator must belong to one and only one of. You can specify the access each Operator group has on each Billing group, if any.

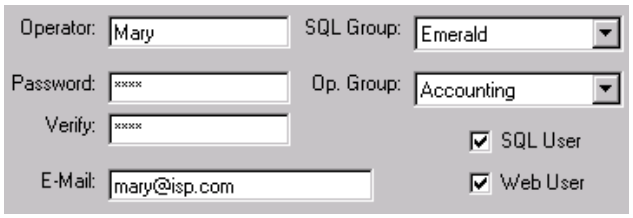
Operator Groups

Operator Groups are a collection of similar Operators. Three sample Operator groups are created by default: Admin, Accounting, and Tech Support. You can add or delete Operator Groups to fit your security requirements.

Another use of Operator groups is when someone is reselling your services. In this situation, you would create a new Operator group for each reseller.

Operators

Before a user can use the Emerald client, they must have an account in the Emerald database. Each user should login with a unique ID to allow Emerald to track changes. By adding an operator to the list, Emerald Administrator creates a user on the SQL Server with the specified information.



By default, four SQL Groups are created for SQL Users. These are important, since the group the user is added to determines whether the user will be forced to use security views. For normal Emerald operators that do not have a restriction on the Billing groups they can edit or view, the user should belong to the Emerald group. However, if the user will have restricted access to only one or a few Billing groups, they should belong to the EmeraldSecure group. The EmeraldAdmin group is for operators who should have access to administrative functions. The EmeraldApps group is for Emerald Applications, like RadiusNT and the Emerald Authentication DLL.

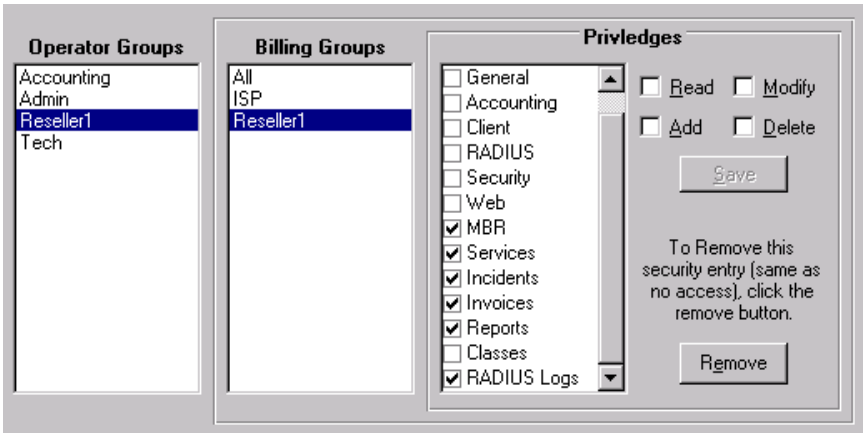
To define an operator, click the Operators tab, then click Add. The Operator is the name Emerald will display and associate with additions, deletions, and modifications. Type the operators password in the Password field, then again in the Verify field to make sure it is accurate. Enter the user's E-Mail address in the E-Mail field, and make sure both the SQL User and Web user options are checked. Place the operator in the Emerald SQL Group and the Operator Group appropriate for the user.

Operator Access

Operator Access allows you to specify which groups Emerald operators can see and what permissions they have. If the Operator is in the Emerald group, the Operator Access is not enforced by Emerald.

The Operator Access configuration is divided into three sections. The left list is each Operator Group defined in Emerald. The middle list is each Billing Group defined in Emerald. The first Group listed is the "Global" group. This is not a real group, but a special group. If you specify privileges for an Operator Group on the Global Billing group, that Operator Group will have that privilege for all of the Billing Groups. This is convenient for not having to specify access for each Billing group.

Once you have selected an Operator group and a Billing group, a third list will appear to the right of them listing the security sections. For each security section, you can specify whether the user will have read, add, modify or delete privileges. As in the Billing group list, the first section listed is the "All" section. The rest of the sections are explained below.



All	All of the below listed privileges.
Admin	**Administrative functions. For these to be modifiable, the Operators must be in the EmeraldAdmin group.**
General	The General section of the Emerald Admin
Accounting	The Accounting section of the Emerald Admin
Client	The Client section of the Emerald Admin
RADIUS	The RADIUS section of the Emerald Admin
Security	The Security section of the Emerald Admin
Web	Web Administration Rights (future use).
Client	**Client Functions. If the Operator is in the EmeraldSecure group, the users they can access are limited to the Groups they have been given access to.**
MBR	Master Billing Record Information
Services	Services Information
Incidents	Incidents and Actions
Invoices	Invoices and Payments
Reports	Reports and Printing
Classes	Future Use
RADIUS logs	Radlogs

Each section can be assigned one or more of the following privileges:

Read	Can view or read items in the section.
Add	Can add new items in the section.
Modify	Can modify items in the section.
Delete	Can delete items in the section.

When you are modifying the privileges for a section, you must click the save button before moving on to a new section, or the changes will be lost. If you want to remove privileges for a section, use the remove button in the bottom right, rather than clearing the four privileges. The check box on the left is an indicator of whether that privilege has been set or not. It is not used to set or remove them.

8. Roaming and RadiusNT Advanced Options

One of the most powerful and flexible features of Emerald is the direct integration of RadiusNT. This allows unmatched features for managing dialup authentication. This chapter will provide additional information to go along with the RadiusNT manual. You should read the RadiusNT manual before reading this chapter.

9. Database Schema

Emerald directly supports and accesses Microsoft SQL Server through the DB-LIB interface (which is not the same thing as ODBC). The DB-LIB interface is feature rich and the native interface for SQL Server. Emerald only uses the ODBC interface for printing via the Crystal Reports print engine. Therefore, it is possible for Emerald to operate correctly w/out ODBC configured.

Table Layout

There are many tables used by Emerald. Below is a list of those tables and a description of their fields. An * after a field denotes a field which is only used or active if a flag or option is set that is not enabled by default.

Rates

The Rates table defines a usage rate, which together with a service defines how to bill a service for usage.

Field	Type	Description
RateID	int	IDENTITY / AutoNumber
Description	varchar (30)	Description of the rate, used when configuring a service type.
StandardInterval	Int	Interval, in seconds, of the standard charge.
StandardHours	smallint	The number of hours included with the rate.
StandardCharge	money	The charge, per hour, for standard usage under the standard number of hours.
OverRefuse	bit	Whether to allow Over usage (currently not supported).
OverInterval	Int	Interval, in seconds, of the standard charge.
OverCharge	money	The charge, per hour, for usage over the standard number of hours.
PrimaryPay	bit	Whether to charge a different rate for a primary period.
PrimaryStart	int	The time (in minutes since midnight) the primary period starts.
PrimaryStop	int	The time (in minutes since midnight) the primary period end.
PrimaryCharge	money	The charge, per hour, for primary usage under the standard number of hours.
PrimaryOverCharge	money	The charge, per hour, for primary usage over the standard number of hours.

External Systems

External Systems are systems which Emerald will either synchronize or integrate with.

Field	Type	Description
ExternalSystemID	int	IDENTITY / AutoNumber
Name	varchar (25)	The display name of the External System (used when configuring Account Types).
Type	int	The type of the External System: 0-Standard, 1-Post.Office 1.0/2.0, 2-Netscapte 2.0, 3-Post.Office 3.0, 4-NTMail, 5-WindowsNT SAM, 6-MailSite 2.0
Description	varchar (50)	A description for this External system.
SmartHost	varchar (40)	For 1-3, this is the SMTP server to send the mail requests to.
Accounts	varchar (40)	For 1-3, this is the accounts manager email address.

PostMaster	varchar (40)	For 1-3, this is the postmaster email address.
Password	varchar (16)	For 1-3, this is the postmaster password.
FormID	varchar (40)	For 1-3, this is the FormID of the account form.
WorkDir	varchar (50)	For 0, this the path for the file to be appended (primary file)
LogFile	varchar (50)	For 0, this the path for the file to be appended (archive file)

Domains

Domains are internet domains that a group will be associated to. The domain is used to complete or create the default E-Mail address for a service, if one is not specified.

Field	Type	Description
DomainID	int	IDENTITY / AutoNumber
Domain	varchar (25)	The display name of the domain.
MailDomain	varchar (25)	The fully qualified internet domain.
Description	varchar (45)	A description of the domain.

Groups

A group is a set of MBRs that are related. Groups are the basis of organizing information in Emerald, including restricting sub-sets of options. Additionally groups can have specific billing information.

Field	Type	Description
GroupID	int	IDENTITY / AutoNumber
DomainID	int	The DomainID of the domain the group is associated it.
GroupName	varchar (25)	The display name of the group.
Description	varchar (45)	The description of the group.
InvoiceReport	varchar (45)	The Invoice Report for this group to override the global report.
EmailReport	varchar (45)	The Email Invoice Report for this group to override the global report.
UniqueLogins	bit	Whether the group will have unique logins, excluding other groups.
GlobalOptions	bit	Whether the group allows global objects or only those specific to it.
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).
FTPDir	varchar(64)	Default FTP directory for the group (overrides the global directory).

DNISGroups

A DNIS Group is a set of DNIS numbers which can be used collectively to restrict access to services.

Field	Type	Description
DNISGroupID	int	IDENTITY / AutoNumber
DNISGroup	varchar (25)	The display name of the DNIS Group
Description	varchar (45)	The description of the DNIS Group.

DNISNumbers

The DNISNumbers table defines DNIS Numbers which belong to a DNIS group.

Field	Type	Description
DNISGroupID	int	DNISGroupID the DNIS number is associated to.
DNISNumber	varchar (10)	The DNIS number.

BillingCycles

The BillingCycles table defines how Emerald will bill a MBR.

Field	Type	Description
BillingCycleID	int	IDENTITY / AutoNumber
Description	varchar (45)	Description of the billing cycle
Monthly	bit	Whether new account expiration dates are monthly (1) or anniversary (0).
AutoBill	bit	Whether accounts will be billed Balance forward (1) or Renewal (0).
IBillDays	int	How many days in advance to bill postal Invoice customers.
EBillDays	int	How many days in advance to bill email Invoice customers.
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).
GroupID	int	The GroupID of the associated Group (or NULL for global).

Taxes

The Taxes table defines the basic taxes you can apply to Charges, Services, and other items in Emerald.

Field	Type	Description
TaxID	int	IDENTITY / AutoNumber
Tax	real	The first tax value for a single, two, or piggy back tax options.
Tax2	real	The second tax value for a two or piggy back tax options.
TaxType	tinyint	The type of tax. 1=single, 2=dual, 3=piggyback.
Description	varchar(20)	Description of the tax.

ChargeTypes

The ChargeTypes table contains the charges that can either be applied generically to an MBR, or associated to an Account Type to be a setup charge.

Field	Type	Description
ChargeTypeID	int	IDENTITY / AutoNumber
Description	Varchar(45)	Description of the charge that will put on the Invoice line item.
Amount	Money	The amount of the charge.
TaxID	Int	The TaxID of the associated Tax (or NULL for none).
GroupID	Int	The GroupID of the associated Group (or NULL for global).

AccountTypes

AccountTypes are the recurring Services that can be added to a MBR.

Field	Type	Description
AccountType	varchar(15)	Name of the Account Type
Description	varchar(30)	Description of the Account Type
Cost	money	The base cost of the Account Type.
ApplyDiscount	bit	Whether to apply termed discounts or not.
TaxID	Int	The TaxID of the associated Tax (or NULL for none).
RateID	int	The Rate the Account Type is associated to.
ChargeTypeID	Int	The ChargeTypeID of the associated Charge (or NULL for none).
ExternalSystemID	int	The External System the Account Type is associated to (or NULL).
GroupID	int	The GroupID of the associated Group (or NULL for global).
DNISGroupID	int	The DNIS Group the Account Type can dial in from (or NULL if not applicable).
Prefix	varchar (8)	An allowed Prefix (currently not supported).
Suffix	varchar (8)	An allowed Suffix (currently not supported).
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

ChargeTypes

ChargeTypes are the list of Charges that are displayed when you manually add a charge to an MBR.

Field	Type	Description
ChargeType	varchar (15)	The displayed name of the Charge Type.
Description	varchar (45)	The description of the Charge type.
Amount	money	The amount of the Charge type.
GroupID	int	The GroupID of the associated Group (or NULL for global).

RadVendors

RadVendors are the RADIUS vendors which support the Vendor Specific Attribute (26).

Field	Type	Description
RadVendorID	integer	Vendor ID
Name	varchar(32)	Vendor Name

RadAttributes

RadAttributes are the RADIUS attributes RadiusNT use when sending and receiving RADIUS requests.

Field	Type	Description
RadAttributeID	integer	Unique RADIUS Attribute ID
RadVendorID	int	If this attribute is a Vendor Specific Attribute (RadAttributeID = 26) then this denotes the Vendor ID. Otherwise the value should be NULL or 0.
RadVendorType	int	If this attribute is a Vendor Specific Attribute (RadAttributeID = 26) then this denotes the Vendor Type. Otherwise the value should be NULL or 0.

Name	varchar(25)	RADIUS Attribute Name
Type	int	RADIUS Attribute Type 1 String 2 32-bit Integer 3 IP Address 4 Date 5 Ascend Binary

RadValues

RadValues are lookup values for certain Attributes which have a specific set of numerical values.

Field	Type	Description
RadAttributID	integer	Related RadAttributeID from RadAttributes table.
Name	varchar(25)	Value Name
Value	integer	Value Number

SystemTypes

SystemTypes are the pick list values for a Service's System Type.

Field	Type	Description
SystemType	varchar (15)	Display name of the System Type
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

ReferredBys

ReferredBys are the pick list values for a MBR's Referred By field.

Field	Type	Description
ReferredBy	varchar (25)	Display name of the Referred By.
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

SalesPersons

SalesPersons are the pick list values for a MBR's Sales Person field.

Field	Type	Description
SalesPerson	varchar (25)	Display name of the System Type
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

InvoiceTypes

InvoiceTypes are the tpe of Invoices Emerald makes available.

Field	Type	Description
InvoiceType	varchar (15)	Display Name for the Invoice Type
GroupID	int	The GroupID of the associated Group (or NULL for global).

Taxes

The Taxes table define a tax which is available to Emerald.

Field	Type	Description
TaxID	int	IDENTITY / AutoNumber
Amount	real	Amount of the Tax
Description	varchar (32)	Description of the Tax

Regions

The regions table defines the regions available to a MBR.

Field	Type	Description
Region	varchar (15)	Display name of the region.
GroupID	int	The GroupID of the associated Group (or NULL for global).
Taxable	tinyint	The taxable option of an MBR is set to this value when you create an MBR in this region.
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

Reports

The Reports table defines the information about the Global Reports available.

Field	Type	Description
ReportID	int	IDENTITY / AutoNumber
Report	varchar (35)	Display name of the Report.
FileName	varchar (15)	Filename of the report.

Discounts

The Discounts table defines Discounts available to a service.

Field	Type	Description
Discount	varchar (20)	Display name of the Discount.
Percentage	real	Amount of the Discount (times 100, so 8.5% would be 91.5)
GroupID	int	The GroupID of the associated Group (or NULL for global).
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

ModemSpeeds

The ModemSpeeds table defines Modem Speeds available to a service.

Field	Type	Description
ModemSpeed	varchar (5)	Display name of the Modem Speed.
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

NetSoftwares

The NetSoftwares table defines Network Software available to a service.

Field	Type	Description
NetSoftware	varchar (15)	Display name of the Network Software.
Map	smallint	Mapping used for the External System (standard type).
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

PayMethods

The PayMethods table defines Payment Methods available to an MBR.

Field	Type	Description
PayMethod	varchar (15)	Display name of the Payment Method.
GroupID	int	The GroupID of the associated Group (or NULL for global).
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

PaymentTypes

The PaymentTypes table defines Payment Types list when a payment is made. These are for reporting and tracking purposes only, and should not be confused with the PaymentMethods table, which is the table that lists what method a MBR is to be billed.

Field	Type	Description
PaymentType	varchar (16)	Display name of the Payment Type.
GroupID	int	The GroupID of the associated Group (or NULL for global).
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

ServerTypes

The ServerTypes table defines the type of Servers available when defining a Server.

Field	Type	Description
ServerType	int	The type of the server.
Vendor	varchar(32)	The Vendor of the Server
Model	varchar(32)	The Model of the Server.

Servers

The Servers table defines Terminal Servers (or RADIUS clients) which can make requests to RadiusNT.

Field	Type	Description
ServerID	integer	IDENTITY / AutoNumber
Server	varchar(25)	The Server Name. This is a RADIUS client that will be making requests to RadiusNT.
IPAddress	varchar(16)	IP Address of the server.
Secret	varchar(16)	Shared Secret used between the server and RadiusNT.
Location	varchar(15)	Location of the Server. This is used to logically sort servers into areas (i.e. a Point of Presence/POP). It is typically one of your regions.
Ports	tinyint	The number of ports on the server. This is the count, not the format.
Modems	tinyint	The number of modems. This is an informational field only.
PhoneNumber	varchar(12)	Phone Number of the primary hunt group for this server.
ContactName	varchar(25)	Contact Name for this server. This as an informational field only.
ContactPhone	varchar(12)	Contact Phone for this server. This as an informational field only.
ContactPage	varchar(12)	Contact Pager for this server. This as an informational field only.
Comments	text	Comments for this server. This as an informational field only.
DynamicStart	varchar(16)	The starting dynamic assigned IP Address that the server will assign user IP Addresses from. This as an informational field only and is not used by RadiusNT.
DynamicEnd	varchar(16)	The ending dyanmic assigned IP Address that the server will assign user IP Addresses from. This as an informational field only and is not used by RadiusNT.
Community	varchar(16)	The SNMP community string for this server.
SNMPType	int	The type of SNMP to use with this server for concurrency checking.
RadRoamServerID	int	If Server based proxy is enabled, this defines the RADIUS server (from RadRoamServers table) of where to automatically forward the request to. If this field is NULL, the request is not automatically forwarded.

ServerPorts

The ServerPorts table defines each port for each Server.

Field	Type	Description
ServerID	integer	Related ServerID From Servers.
Port	integer	The port number the NAS returns in the NAS-Port attribute.
IPAddress	varchar(16)	The IP Address to assign the user is one is not specifically assigned. This field is not currently used by RadiusNT.
MaxSessionTime	int	The Maximum session time a user may stay on-line, is one is not specfically assigned elsewhere. This requires NAS support of the Session-Timeout attribute.
CostPerMinute	int	A cost, in cents per minute, to charge for using this port. Set to zero for no per minute charges.
UserName	varchar(32)	Last Username on the port. Used to track who is on this port.
AcctStatusType	tinyint	Status of the last user on the port. 1 means the users is currently on-line, and anything else means there is no-one on this port. Used to track who is online.
CallDate	datetime	Date of the last user on the port. If AcctStatusType is 1, it is the date the

		user logged on. If AcctStatusType is 2, it is the date the user logged off. Used to track who is online.
FramedAddress	varchar(16)	IP Address of the last user on the port. Used to track who is online.
SNMPUser	varchar(64)	The SNMP OID for RadiusNT to query to find out who the current user on this port is.
CallerID	varchar(15)	The Caller-ID information of the dialed in user. The NAS must support this attribute for it to be filled in.
ConnectInfo	varchar(32)	The Connection Info (modem speed) of the dialed in user. The NAS must support this attribute for it to be filled in.

PayPeriods

The PayPeriods table defines Payment Periods which are available to MBRs.

Field	Type	Description
PayPeriod	varchar(12)	The name of the pay period.
Period	smallint	The number of months in the pay period.
Percentage	real	The discount for this pay period, if the account type allows termed discounts.
SetupCharge	bit	Whether to apply a setup charge for this pay period.
GroupID	int	The GroupID of the associated Group (or NULL for global).
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

Calls

The Calls table stores Accounting Call records. It is unique in that RadiusNT will dynamically read the table to find out what records to store. The field names and types much match an entry from the RadAttributes table, except that the field names do not include the dashes.

Field	Type	Description
AcctSessionID	varchar(16)	NAS generated unique ID for the call
NASIdentifier	varchar(16)	Identifier for the NAS. This is typically the IP Address of the NAS.
AcctStatusType	tinyint	Accounting record type 1=Start, 2=Stop
NASPort	integer	NAS Port the call came in on
CallDate	datetime	Date of the Call
UserName	varchar(32)	Username of the caller
		The above fields are the BASE required fields. You can, and should, add more fields to allow storage of the fields you need to use. Some common fields to add would be AcctSessionTime and AcctDelayTime.
AcctDelayTime	int	The number of seconds representing how long the record was held in the NAS before sending to RadiusNT. You must subtract this number from the CallDate to find out the real date of the accounting record.
AcctSessionTime	int	The number of seconds the session was active.
FramedAddress	varchar(16)	The IP Address the user was assigned, if the service type was a framed service.
AcctInputOctets	int	The number of octets (bytes) the user sent (from the user to the NAS).
AcctOutputOctets	int	The number of octets (bytes) the user received (from the NAS to the user).

AcctTerminateCause	tinyint	The reason why the session was closed. Some NASes do not support this.
NASPortType	tinyint	The type of Port the user called. Usually this is Async or ISDN.
NASPortDNIS	varchar(10)	The DNIS number the user called.
CallerID	varchar(15)	The number the user called from.
ConnectInfo	varchar(32)	The connect string detailing the connection, if the NAS is digital.

MasterAccounts

The MasterAccounts table contains the first tier account information for a billable account. This is the primary table for customer information.

CustomerID	integer	IDENTITY / AutoNumber
ReferredBy	varchar(25)	Who the user was referred by.
FirstName	varchar(25)	The user's first name.
LastName	varchar(25)	The user's first name.
Company	varchar(35)	The company the user is associated to.
Address1	varchar(50)	The first address line.
Address2	varchar(50)	The second address line.
City	varchar(25)	The user's city.
State	varchar(3)	The user's state.
Zip	varchar(12)	The user's zip code.
PhoneHome	varchar(20)	The user's home phone number.
PhoneWork	varchar(20)	The user's work phone number.
PhoneFax	varchar(20)	The user's fax number.
SalesPerson	varchar(25)	The sale's person assigned to the user.
Region	varchar(15)	The primary region the user is located in.
CreateDate	datetime	The creation date of the user's account.
StartDate	datetime	The date the user's account will start.
Active	bit	If this field is 0, the account will not authenticate.
maExpireDate	datetime	Expiration date of the account. If this is NULL the account will not expire.
Extension	integer	An extension, in days, to the Expiration date.
PayPeriod	varchar(12)	The period in which the user will be billed each time for.
PayMethod	varchar(15)	The method the user will pay their bill.
PayInfo	varchar(50)	A comment field about the user's billing habits or problems.
PaidThru	datetime	What date the account is paid up through.
LastReceived	datetime	The last date the user made a payment on.
PONumber	varchar(17)	The last purchase order for the account.
PrePaid	varchar(7)	A Pre-paid amounts. This field is not used by Emerald.
CreditCardNumber	varchar(20)	The credit card number, if the customer is paying via credit card.
CreditCardExpire	varchar(6)	The credit card expire, if the customer is paying via credit card.
CreditCardAuth	varchar(40)	The credit card authorization name, if the customer is paying via credit card.
CreditCardAutoBill	bit	If the customer wants to be automatically billed each pay period on their credit card, this should be set to non-zero (1). Otherwise, if this is 0 and the customer's pay method is set to credit card, they will be billed only the first time on their credit card (the initial signup bill) and will be sent a renewal each time after that.

Comments	text	General comments about the account.
LastModifyDate	datetime	The date the account was last modified by Emerald.
LastModifyUser	varchar(15)	The user to last modify this account by Emerald.
maCurrent	bit	This field will be set to 0 each time anything in the account is modified. It is only applicable to an external system configuration. Otherwise, it can be ignored.
maNew	bit	This field will be set to 0 initially. It is only applicable to an external system configuration. Otherwise, it can be ignored.
GroupID	int	The GroupID of the associated Group.
SendMethod	tinyint	
Taxable	bit	
BillingCycleID	int	
BilledThru	datetime	
OverDue	tinyint	An extension, in days, to the Expiration date.
OverLimit	money	If the Balance field is less than this field, the account will NOT be authenticated. This is used by Emerald only.
Balance	money	See the OverLimit field above. This is used by Emerald only.

SubAccounts

The SubAccounts table contains the second tier account Information. There can be many records from this table which relate to a single record in the MasterAccounts Table. This table is essential the recurring charges for a MBR.

Field	Type	Description
AccountID	integer	IDENTITY / AutoNumber
CustomerID	integer	Related MasterAccounts record
Active	bit	If this field is 0, the account will NOT be authenticated.
Login	varchar(32)	The Login ID for the user.
Shell	varchar(32)	The Shell ID for the user.
AccountType	varchar(15)	The Account Type of the user.
Password	varchar(16)	The password for the user.
saExpireDate	datetime	The Expiration Date for this SubAccount. If this is NULL, the Expiration Date of the MasterAccount is used.
Extension	integer	An extension, in days, to the Expiration Date (SA).
*LoginLimit	tinyint	The Currency Login Limit for the SubAccount.
*TimeLeft	integer	The Login Time Left for the SubAccount. This should be set to NULL for SQL Server if no time limit is set or –9999 for MS Access.
Email	varchar(40)	The E-mail address of the user. This field should usually be left blank, which tells Emerald to use the default E-mail address for the user.
FirstName	varchar(25)	The user's first name.
LastName	varchar(25)	The user's first name.
PhoneHome	varchar(20)	The user's home phone number.
PhoneWork	varchar(20)	The user's work phone number.
DiffCost	bit	If the account should be charged a different amount, and not the default amount from the service type, this will be non-zero (1).
Cost	money	The amount (per month) to charge the service is DiffCost is not 0.
Discount	varchar(20)	The discount to apply to the cost of this service. This must match one of the Discounts table entries, and is not applied if DiffCost is not 0.
Description	varchar(50)	General comments about this account.

MaidenName	varchar(25)	This field is typically used to hold a private piece of information about the user to be used to verify the user's identity.
SystemType	varchar(15)	The user's system type.
ModemSpeed	varchar(5)	The user's modem speed.
NetSoftware	varchar(15)	The user's network software.
SignDate	datetime	The creation date of the user's account.
Operator	varchar(15)	The operator who created this account.
LastModifyDate	datetime	The date the account was last modified by Emerald.
LastModifyUser	varchar(15)	The user to last modify this account by Emerald.
saCurrent	bit	This field will be set to 0 each time anything in the account is modified. It is only applicable to an external system configuration. Otherwise, it can be ignored.
Preferred	bit	If set to non-zero this is a preferred user. The actually use of this field can be implementation specific, as Emerald does not use this field.
saNew	bit	This field will be initially set to 0. It is only applicable to an external system configuration. Otherwise, it can be ignored.
HomeDir	varchar(40)	The account's home directory. This can be used for FTP and Web access.
HomeDirLimit	Int	The maximum size of the user's home dir, in KB (1024 is 1MB).
SendBill	tinyint	When the MBR is configured for E-Mail invoices, this specifies whether this account will be emailed a copy of the invoice.
LastUser	datetime	The last time the account was used.

IncidentTypes

The IncidentTypes table defines the list of Categories that are available when creating an Incident. This is very useful for creating reports or tracking the type of incidents recorded.

Field	Type	Description
IncidentType	varchar(20)	Name of the Incident type.
Description	varchar(64)	Description of the Incident type.
EMail	varchar(40)	Default E-Mail address to send a copy of the Incident and Action to.
SortOrder	tinyint	The sort order when displayed in a list (lowest displayed first).

Incidents

The Incidents table contains the main information of an incident, call, or other issue that is manually tracked for a service.

Field	Type	Description
IncidentID	int	IDENTITY / AutoNumber
AccountID	int	The Service this incident is for.
Date	datetime	The date of the incident.
Operator	varchar(15)	The operator who entered the incident.
Description	text	The description of the incient.
Closed	bit	If 0, the incient is open. Otherwise, the incident is closed.
LastModifyDate	datetime	The date the incident was last modified.
LastModifyUser	varchar(15)	The user who last modified this incident.
IncidentType	varchar(20)	The type of this incident (from the IncidentTypes table).

Actions

The Actions table contains the additional steps, actions, or resolution to an Incident.

Field	Type	Description
ActionID	int	IDENTITY / AutoNumber
IncidentID	int	The incident this action is associated to.
Date	datetime	The date this action was created.
Operator	varchar(15)	The operator who created this action.
Description	text	The full description of this action.
LastModifyDate	datetime	The date this action was last modified.
LastModifyUser	varchar(15)	The user who last modified this action.

RadConfigs

The RadConfigs table contains the set of attributes associated to a specific service. A service is not required to have a set of attributes associated to it.

Field	Type	Description
RadConfigID	integer	IDENTITY / AutoNumber
AccountID	integer	Related AccountID from SubAccounts table.
RadAttributeID	integer	Related RadAttributeID from RadAttributes table.
RadVendorID	int	If this attribute is a Vendor Specific Attribute (RadAttributeID = 26) then this denotes the Vendor ID. Otherwise the value should be NULL or 0.
RadVendorType	int	If this attribute is a Vendor Specific Attribute (RadAttributeID = 26) then this denotes the Vendor Type. Otherwise the value should be NULL or 0.
Data	varchar(99)	Used for String, IP Address or Date Types
Value	integer	Used for Integer Types
RadCheck	tinyint	A zero denotes this is a normal reply attribute. A non-zero denotes this a check attribute.

RadATConfigs

The RadATConfigs table contains the set of attributes associated to a specific service type. A service type is not required to have a set of attributes associated to it.

Field	Type	Description
RadATConfigID	integer	IDENTITY / AutoNumber
AccountType	varchar(15)	Related AccountID from SubAccounts table.
RadAttributeID	integer	Related RadAttributeID from RadAttributes table.
Data	varchar(99)	Used for String, IP Address or Date Types
Value	integer	Used for Integer Types
RadVendorID	int	If this attribute is a Vendor Specific Attribute (RadAttributeID = 26) then this denotes the Vendor ID. Otherwise the value should be NULL or 0.
RadVendorType	int	If this attribute is a Vendor Specific Attribute (RadAttributeID = 26) then this denotes the Vendor Type. Otherwise the value should be NULL or 0.
RadCheck	tinyint	A zero denotes this is a normal reply attribute. A non-zero denotes this a

	check attribute.

Invoices

The Invoices table contains the main information about each invoice in Emerald.

Field	Type	Description
InvoiceID	int	IDENTITY / AutoNumber
CustomerID	int	The MBR this invoice is for (from the MasterAccounts table).
Type	varchar(15)	The invoice type (Credit Card, Renewal, etc).
Description	varchar(30)	The primary description of the invoice. Typically this is the same as the first invoice line item, and is not used specifically by Emerald.
Amount	money	The total amount of the invoice.
Date	datetime	The creation date of the invoice.
StartDate	datetime	The billing start date of the invoice.
EndDate	datetime	The billing end date of the invoice.
Months	smallint	The number of months in the billing period. This field is not used anymore.
LastModifyDate	Datetime	The date the invoice was last modified.
LastModifyUser	varchar(15)	The user who last modified the invoice.
SentDate	datetime	The date the invoice was sent to the user (either printed or E-mailed).
Tax	money	The total primary tax on the invoice (the Amount includes this field).
Tax2	money	The total secondary tax on the invoice (the Amount includes this field).
PreviousBalance	money	The previous balance of the invoice before the new charges.

Payments

The Payments table contains information about each payment made in Emerald.

Field	Type	Description
PaymentID	int	IDENTITY / AutoNumber
CustomerID	int	The MBR this payment is for.
Amount	money	The amount of the payment.
Date	datetime	The Date the payment was received.
LastModifyDate	datetime	The date this payment was last modified.
LastModifyUser	varchar(15)	The user who last modified this this payment.
PayInfo	varchar(15)	A comment about the payment (Check number, etc).
InvoiceID	int	The InvoiceID the payment was applied to (or NULL if it was not applied to a specific invoice).
Type	varchar(16)	The type of the payment.

InvoiceItems

The InvoiceItems table contains an entry for each Invoice Line Item.

Field	Type	Description
ItemID	int	IDENTITY / AutoNumber
InvoiceID	int	Invoice this invoice item is for.
Login	varchar(32)	The login (service) this item is for.

Description	varchar(50)	The description of the service this item is for.
Amount	money	The item cost of the service.
Quantity	int	The quantity (number of months, etc) of the item.
PaymentID	int	For a renewal, this is the PaymentID for this invoice.
TaxID	int	If this item is taxable, this is the tax type for it (from the Taxes table).
Tax	money	The total primary tax on this item (the Amount includes this field).
Tax2	money	The total secondary tax on this item (the Amount includes this field).

Charges

The Charges Table contains an entry for each Charge added to an MBR before it is rolled into an Invoice.

Field	Type	Description
ChargeID	int	IDENTITY / AutoNumber
CustomerID	int	The MBR this charge is for.
Description	varchar(50)	A description for this charge.
Amount	money	
TaxID	int	If this item is taxable, this is the tax type for it (from the Taxes table).
Tax	money	The total primary tax on this item (the Amount includes this field).
Tax2	money	The total secondary tax on this item (the Amount includes this field).
ItemID	int	When the charge is applied to an invoice, this is the invoice item representing the charge.
LastModifyDate	datetime	The date the charge was last modified.
LastModifyUser	varchar(15)	The user who last modified this charge.

ObjectGroups

The ObjectGroups table contains group information for security objects.

Field	Type	Description
ObjectGroupID	int	IDENTITY / Autonumber.
ObjectGroup	varchar(32)	Name of the Object Group.

OperatorGroups

The OperatorGroups table contains group information about each Operator Group.

Field	Type	Description
OperatorGroupID	int	IDENTITY / Autonumber
OperatorGroup	varchar(32)	The name of the Operator Group
Description	varchar(64)	The description of the Operator Group

Operators

The Operators table contains information about each Operator.

Field	Type	Description

OperatorID	int	IDENTITY / Autonumber
OperatorGroupID	int	The Operator Group the Operator belongs to.
Operator	varchar(16)	The name of the Operator.
Password	int	The Operator's password for Web access.
EMail	tinyint	The Operator's E-Mail address.
WebObjectAccess	int	The Operator's Web access.

OperatorGroupAccess

The OperatorGroupAccess table contains Operator group access information for each Operator Group.

Field	Type	Description
OperatorGroupID	int	The Operator Group.
GroupID	int	The Group. This can be (-1) to mean all Groups.
ObjectGroupID	int	The Object Group. This can be (-1) to mean all Object Groups.
Access	int	The Type of Access for the OperatorGroup.

ServerAccess

The ServerAccess table contains Service access information for each server and port.

Field	Type	Description
		The ServerAccess table contains information on which AccountTypes can access which ports.
ServerID	integer	Related ServerID from Servers
Port	integer	Related Port from ServerPorts
AccountType	varchar(15)	Related AccountType from AccountTypes
MaxSessionLength	integer	The Maximum Session length allowed
StartTime	integer	The start time allowed to login
StopTime	integer	The stop time allowed to login

Configs

The Configs table contains global configuration information for Emerald.

Field	Type	Description
ConfigID	int	The unique configuration number.
Type	tinyint	The type of the configuration (string or integer).
Value	int	The value for the configuration, if it is an integer.
Data	varchar(100)	The date for the configuration, if it is a string.

Liscenses

The Licenses table contains the company and MBR license information for Emerald.

Field	Type	Description
LiscenseID	varchar(25)	The License key
Company	varchar(40)	The Company name the License. This is case sensitive and much match exactly to what was provided with the license key itself.

RadLogMsgs

The RadLogMsgs table provides text descriptions of the RadLogMsgID numbers in the RadLogs table.

Field	Type	Description
RadLogMsgID	integer	Log Message Identifier (see the section below on ODBC Logging for more details).
Description	varchar(50)	Description of the Log Message Identifier
Severity	integer	Severity of the Log Message

RadLogs

The RadLogs table contains Log Information from RadiusNT about failed authentication requests.

Field	Type	Description
RadLogMsgID	integer	Related Log Message Identifier from RadLogMsgs
LogDate	datetime	The date of the message
UserName	varchar(32)	The associated username (if one exists)
Data	varchar(50)	Additional data, dependent on the Log Message ID

ExternalTrans

The ExternalTrans Table contains entries for External Billing Transactions handled outside of Emerald.

Field	Type	Description
TransID	int	IDENTITY / AutoNumber
InvoiceID	int	The Invoice this transaction is for (from the Invoices table).
TransType	int	The type or state of the transaction: 0 – Needs to be batched out, 2 – batched out, 3 – declined/problem, 4 – completed/good, 7 – needs to be re-batched, 8 – was re-batched, 9 – void.
ReqDate	datetime	The date the transaction was requested.
ProcDate	datetime	The date the transaction was processed.
Amount	money	The amount the transaction is for.
PaymentID	int	The Payment for this transaction (usually only is type is 4).
ApproveCode	varchar(12)	The approval code.
Response	varchar(12)	The response from the external system.
PS2000	varchar(35)	Generic information about the transaction.
LastModifyDate	datetime	The date the transaction was last modified.
LastModifyUser	varchar(15)	The user who last modified the transaction.

RadRoamServers

The RadRoamServers table contains information about each RADIUS Server RadiusNT may forward requests to.

Field	Type	Description
RadRoamServerID	integer	IDENTITY / AutoNumber
IPAddress	varchar(16)	IPAddress of Roam Server
Server	varchar(32)	Name of Roam Server
Secret	varchar(16)	Secret to use for requests going to Roam server
Timeout	integer	Number of seconds to wait for a reply (not currently used)
Retries	integer	Number of retries (not currently used)
TreatAsLocal	bit	Do not proxy domain and treat user as local
StripDomain	integer	Strip the domain from the username before sending
AuthPort	integer	Port number to send authentication requests to (1645)
AcctPort	integer	Port number to send accounting requests to (1646)
AllowRLogin	tinyint	A non-zero value allows a RLogin Framed-Service type

RadRoamDomains

The RadRoamDomains table contains the domains RadiusNT can proxy requests for and which Roam Server the request should be forwarded to.

Field	Type	Description
RadRoamDomainID	integer	IDENTITY / AutoNumber
RadRoamServerID	integer	Roam Server to forward requests to
Domain	varchar(32)	Roam Domain in the login (user@domain)
Priority	integer	Roam Server's Priority for the domain
CostPerMinute	integer	Cost per minute (cents) for the roam (not currently used)
AccountType	varchar(15)	If this is not NULL, then RadiusNT will ignore the attributes returned in the proxy reply and return the set of attributes associated to this account type.

RadTriggers

The RadTriggers table contains program information for RadiusNT which can be executed when the associated account logs in (accounting start record).

Field	Type	Description
RadTriggerID	integer	IDENTITY / AutoNumber
AccountID	integer	Related AccountID from SubAccounts
Type	integer	Type of trigger (currently not used)
Filename	varchar(64)	Executable program or file to run
Parameters	varchar(64)	Parameter for the program or file
Directory	varchar(128)	Working directory for the program or file

CallHistory

The CallHistory table contains summary information based on entries from the Calls table.

Field	Type	Description
AccountID	int	The service this is for.
StartDate	datetime	The Start date of the summary
Months	int	The number of months the summary is for (always 1).
Mins	int	The number of minutes during the summary.
Calls	int	The number of calls during the summary.
ChargeID	int	If a charge was created based on the usage, this will be the charge id from the charges table.

10. Trouble Shooting

Installation and Setup Problems

- During installation, I receive an error telling me that a file is in use. What should I do?

  Typically when a file is in use, it means another program (like a service on NT) is running and has the file open. Usually you can just ignore the error without causing any problems. However, if Emerald fails to run after the installation, you will need to stop the program using the file and re-run installation.

- Do I really have to re-boot after installation if it tells me to?

  Usually you do not need to reboot after installation. However, if you some of your system files are out of date, the installer will need to update them and re-boot your computer before the installer can continue.

- During installation, I receive an error telling me that the file shdocvw.dll could not be registered. Why did I receive this and what should I do?

  The file shdocvw.dll is a link to Internet Explorer 4.0 or higher that provides the engine for the browser in Emerald. If you do not have IE 4.0 installed on your computer, simply ignore the error and Emerald will mark the browser as not available. To later enable the browser after installing IE 4.0 or higher, you will need to re-install Emerald.

- During installation I receive an error telling me vbsql.ocx could not be registered. When I try to run the Admin, I receive an error telling me that vbsql.ocx could not be loaded. How to I correct this?

  You must install the MS SQL Server client before installing or running Emerald. This can be done by running the setup.exe from the SQL distribution and choose the "client utilities" option.

Startup Problems

- When I start the Admin program for the first time, there is no information in the login prompt. What should I login with?

  When you first install Emerald, you should connect to your SQL Server as "SA" and the Master database. The default SA password is blank, unless you or the administrator has changed it. Once you login, the Admin will automatically take you to the create database screen. Follow the directions in Chapter 1 for creating the database.

- The database creation failed and now I can't re-create the database. How can I fix this?

  Most likely the problem is that the database device still exists. Go into SQL Enterprise manger and drop the EmerDev and EmerLog database devices. Once those are dropped, you still need to delete the physical file for them as well. These are located in the directory you specified when you first tried to create the database (default is x:\mssql\data, where x is the drive you installed SQL Server to) and names EmerDev.Dat and EmerLog.dat.

- When I delete a database via the Admin and then try to re-create the database, the Admin hangs when creating the new database.

This is a known problem between SQL Server and the Emerald admin. You must stop and restart SQL Server before creating the new database. Simply re-starting the admin will not correct the problem. You will need to manually remove the database devices as well.

Configuration Problems

- When I try to delete an item, I receive a error saying the delete failed. What causes this and how can I delete the item?

  The database will not let you delete some items that are being referenced by other items. For example, to delete a billing group, there can not be any items referencing it (like region, services, etc) as well as no MBR can be using that billing group.

- The changes I make in the Emerald Admin are ignored by Emerald until I restart Emerald. How can I make Emerald see the changes immediately?

  Some fields in the database are cached in memory when Emerald starts to speed up the display. The only way to get Emerald to re-load the cached information is to restart it.

11. Frequently Asked Questions

This chapter covers frequently asked questions about the Emerald Administrator. Please also see the Emerald User's guide for answers to frequently asked questions about the Emerald Client as well.

Install

- *What components should I choose during install?*

  A typical workstation will only need the Emerald and Emerald Admin (optional) components to function correctly. Emerald Administrators may also want to install the reports so they can copy them to a global directory for all users to use (the path is defined in the Admin). When you install RadiusNT, you will only need to choose that component unless other applications on the machine will need the EmerAuth DLL. On machines that only need the EmerAuth DLL, you only need to choose that component.

- *How do I install the reports?*

  You need to copy the *.rpt files from an installation directory that has the reports component checked to the global directory specified in the Emerald Admin. Make sure each user running Emerald has at least read access to that directory as well.

- *Where should I install RadiusNT to? Does it has to be on a machine running Emerald?*

  You should install RadiusNT on a machine that is dedicated to network services. This can either be the machine running your SQL Server, or another server. It is not recommended to install RadiusNT on a user's machine for performance and reliability reasons. You can install RadiusNT on multiple computers all pointing to the same SQL server for backup purposes.

- *Can I install Emerald 2.5 into a directory where Emerald 2.2 or lower is installed to?*

  Although you can, we recommend either removing the prior installation of Emerald, or installing into a separate directory. If you install into the same directory, the uninstall for the previous version will not work anymore.

Configuration

General

- *What is an external system and why would I need one of them?*

External systems are only needed if Emerald will be used with an application or system that is not specifically integrated with Emerald. This could be a mail system, news system, etc. Chapter 3 explains more in depth information about External Systems.

- *How do I create reports and add them to Emerald.*

  Emerald uses and includes the Crystal Reports 6.0 print engine. To create a report, you need the Professional Version of Crystal Reports 6.0 of higher. Once you have created the report and put it into the global reports

directory, add the report to the Custom Report list in the Admin and the report will show up in the client's report list.

Accounting

- *Can I specify an exact value for each service type's pay period?*

  The multi-month pay periods are calculation based on the base charge of the service type. You can not specify an exact value for the different pay periods for a specific service type.

- *What tax types do Emerald support.*

  Emerald supports single tax, dual tax (two taxes based on the original amount) and piggyback tax (two taxes where the first tax is based on the original amount, and the second tax is based the original amount plus the first tax). All taxes are tracked by type and amount for flexible and accurate reporting.

- *How do I create a setup charge for a service?*

  Define the charge as a normal charge and then select that charge, when configuring the service type, as the setup charge.

- *How do I configure Emerald to billing usage at two different rates based on the time of the call?*

  Define a rate with both a standard charge and a primary charge. Configure the time of the primary charge to be one of the two time slots and what charges will be associated with it. Define the standard charge with the other. If one of the time slots will not be billed for usage, set the charge for that time slot to 0.

- *Can I specify a separate invoice for each group?*

  In the General section, you can define a separate invoice for each billing group you define.

Security

- *Can an operator be in more than one Operator Group?*

  Each operator must belong to one and only one operator group. The permissions of the operator are based on the operator group the operator is in. You can not set permissions on the operator directory.

- *What SQL group should an operator be in for the security to work correctly?*

  The operator must be in the EmeraldSecure or EmeraldAdmin group. The Emerald group, by default, does not have access to the security views.

Vendor Support

Emerald supports several different mail vendors. Most mail vendors either directly support connecting to the Emerald database, or using the EmerAuth DLL to connect to the Emerald database. However, some mail servers, like Post.Office and Netscape MTA, only support a one-way synchronization

Emerald also supports Serv-U FTP and DNews authentication. Both of these are also included in the EmerAuth DLL and documented in the EmerAuth documentation.

Rockliffe Mailsite

- *How does Emerald work with Mailsite?*

  Mailsite comes out of the box ready to work with Emerald. You simply need to configure an ODBC DSN pointing to the Emerald database and configure the Mailsite database plug-in to use the ODBC DSN. You should also configure an External system in the Emerald admin and use that ES ID when configuring Mailsite.

- *Can I configure an SQL mail list to send mail to all Emerald users?*

  Emerald includes a stored procedure called SendMailUsers which will return the list of users in the format that Mailsite is expecting. If you want to restrict the list, you can modify the stored procedure as needed.

- Why are users not showing up in Mailsite that are listed in Emerald? Do I have to manually add the users into Mailsite using the Mailsite configuration program?

  When you configure the database mailbox plug-in, you can tell it to automatically create accounts for certain domains. With that enabled for the domains configured in Emerald, the user will automatically be created when they first receive a message or first check their mail.

Internet Shopper NTMail

- *How does Emerald work with NTMail?.*

  The NTMail user API is supported by the EmerAuth DLL that is included with Emerald. Please see the EmerAuth documentation for more details on using it.

- *Can I configure aliases and forwards in Emerald?*

  The NTMail API does not include features to support forwards. Although it is possible to support aliases, Emerald does not support them either. You have to use the NTMail admin to configure aliases or forwards.

Appendix A. Batch Credit Card Formats

Emerald supports many different Credit Card software packages to help you automate billing. A batch file is used to send transactions from Emerald to the software, and another batch file is used to return the results of the transactions back to Emerald.

Note: *These files are typically described from the batch software's point of view, therefore the **batch in** file is what Emerald creates and is read in by the batch software. The **batch out** file is written by the batch software and read in by Emerald.*

Many software packages allow you to configure the fields in the batch file. The following sections detail each of the batch file formats were necessary. In almost all cases, Emerald will provide a unique transaction number (transid) for each record sent the CC processing system. It is important that the CC processing system return this untouched so that Emerald can match the results with the original transaction.

*Soft*Deposit*

Soft*Deposit uses a set length, non-configurable batch file for both batch in and batch out. This file format is fairly extensive and covered in detail in the Soft*Deposit user manual. Both batch in and batch out are supported with or without AVS.

MAPP-PC

The MAPP-PC batch out file consists of nine fields, each delimited by the "|" character. There are an additional five blank fields on the end of each line after these nine fields. The only different between the 9.x version and the prior version is the type for 9.x is "10$" for capture, whereas the prior version was "09$" for auth only.

Batch In

#	Description	Details
1	Type/Transaction ID/ Date/Time	09$XXXXXXXX mm-dd-yyyyhh:mm:ss 09 = Auth/AVS, $ = Manual, XXXXXXXX=TransID Date/Time: mm-dd-yyyyhh:mm:ss
2	N/A	
3	N/A	
4	Credit Card Number	The credit card number13-16 numeric digits
5	Credit Card Expire	four numeric digits in the form mmyy
6	Credit Card Auth Name	The name on the card
7	AVS	The billing Address Verification numbers
8	Zip Code	The billing zip code
9	Amount	The amount of the transaction.

Batch Out

The Batch Out file must contain at least 17 fields, comma delimited. Field 1 has the same format as Field 1 in the Batch in file. The rest of field 17 contains the approval and response codes. If the first four characters of field 17 is "APPR" then the transactions was approved

Card Soft

The Card Soft batch out file consists of six fields, each delimited by a comma. All fields are quoted as well.

Batch In

#	Description	Details
1	Type	C1 = Capture
2	Username	The Emerald operator's name
3	Transaction ID	The Transaction ID
4	Credit Card Number	The credit card number13-16 numeric digits
5	Credit Card Expire	4 numeric digits in the form mmyy
6	Amount	The amount of the transaction.

Batch Out

The Batch Out file contains two lines per transaction. The first line is the exact same line Emerald wrote out in the Batch In file. The second like must contain six fields, comma delimited. Field 1and 2 is the process date and time.
Field 3 is the response code, and first 4 is the approval code. If the first characters of field 4 is "A" then the transactions was approved.

TelePC

The TelePC batch out file consists of five fields, each delimited by a comma.

Batch In

#	Description	Details
1	Credit Card Number	The credit card number13-16 numeric digits
2	Credit Card Expire	four numeric digits in the form mmyy
3	Amount	The amount of the transaction
4	Zip Code	The billing zip code
5	AVS	The billing Address Verification numbers

Batch Out

Batch out support for TelePC is not supported.

PTC AVS

The PTC batch out file consists of 16 fields, each delimited by a comma. All fields except the CC Number, Zip Code, Tip, and Amount are quoted.

Batch In

#	Description	Details
1	Type	S = Capture
2	Credit Card Number	The credit card number13-16 numeric digits
3	Credit Card Expire	four numeric digits in the form mmyy
4	Credit Card Auth Name	The name on the card
5	AVS	The billing Address Verification numbers
6	Zip Code	The billing zip code
7	Transaction ID	The transaction ID
8	OperatorID	The Emerald Operator's ID. Currently this is always set to 0.
9	"1"	
10	Blank	
11	Blank	
12	"2"	
13	Blank	
14	Blank	
15	Tip	Always 0.00
16	Amount	The amount of the transaction

Batch Out

The Batch Out file must contain six fields, comma delimited. Field 1and 2 is the process date and time. Field 3 is the response code, and field 4 is the approval code. The Transaction ID is field 5. If the first character of field 3 is not a "C" or an "S", the transaction is ignored. If field 4 starts with "AUTH/TKT" the transaction was approved, otherwise the transactions was denied.

PTC non-AVS

The PTC non-AVS batch out file consists of six fields, each delimited by a comma. All fields except the CC Number, and Amount are quoted.

Batch In

#	Description	Details
1	Type	S = Capture
2	Credit Card Number	The credit card number13-16 numeric digits
3	Credit Card Expire	four numeric digits in the form mmyy
4	Credit Card Auth Name	The name on the card
5	Transaction ID	The transaction ID
6	Amount	The amount of the transaction

Batch Out

The Batch Out file must contain six fields, comma delimited. Field 1and 2 is the process date and time. Field 3 is the response code, and field 4 is the approval code. The Transaction ID is field 5. If the first character of field 3 is not a "C" or an "S", the transaction is ignored. If field 4 starts with "AUTH/TKT" the transaction was approved, otherwise the transactions was denied.

PC-Charge

The PC-Charge batch out file consists of nine fields, each delimited by a comma. All fields are quoted.

Batch In

#	Description	Details
1	Type	1 = Capture
2	Credit Card Number	The credit card number13-16 numeric digits
3	Credit Card Expire	four numeric digits in the form mmyy
4	Amount	The amount of the transaction
5	Transaction ID	The transaction ID
6	Zip Code	The billing zip code
7	Street Address	The billing street address
8	Username	The Emerald Operator's Username

Batch Out

PC-Charge writes two batch out files, one with a .app extension (the approved ones) and one with a .bad extension (the declined ones). When you specify the batch out file in Emerald, do not include the extension, as Emerald will add the extensions for you. The Batch Out file must contain at least 8 fields, comma delimited. Field 5 is the transaction ID and field 8 is the approval code.

IC Verify non-AVS

The IC Verify non-AVS batch out file consists of six fields, each delimited by a comma. All fields are quoted.

Batch In

#	Description	Details
1	Type	C1 = Capture
2	Transaction ID	The transaction ID
3	Company Name	The Company Name (if any)
4	Credit Card Number	The credit card number13-16 numeric digits
5	Credit Card Expire	four numeric digits in the form mmyy
6	Amount	The amount of the transaction

Batch Out

The Batch Out file contains two lines per transaction. The first line is the exact same line Emerald wrote out in the Batch In file. The second line must contain at least six fields, comma delimited. Fields 1and 2 are the process date and time. Field 3 is the response code and field 4 is the response code. If the first characters of field 4 is "A" then the transactions was approved.

CyberCash

The CyberCash batch out file consists of nine fields, each delimited by a comma. All fields are quoted except for the transid, zip code and amount.

Batch In

#	Description	Details
1	Transaction ID	The transaction ID
2	Credit Card Auth Name	The name on the card
3	Credit Card Number	The credit card number13-16 numeric digits
4	Credit Card Expire	four numeric digits in the form mmyy
5	AVS	The billing Address Verification numbers
6	Zip Code	The billing zip code
7	Amount	The amount of the transaction

Batch Out

The Batch Out file must contain 4 fields, comma delimited. Field 1 is the transaction ID, and if field two is greater than 0, the transaction was approved. Field 3 is the approval code and field 4 is the process data.

IC Verify

The IC Verify AVS batch out file consists of nine fields, each delimited by a comma. All fields are quoted.

Batch In

#	Description	Details
1	Type	C1 = Capture
2	Transaction ID	The transaction ID
3	Company Name	The Company Name (if any)
4	Credit Card Number	The credit card number13-16 numeric digits
5	Credit Card Expire	four numeric digits in the form mmyy
6	Amount	The amount of the transaction
7	Approval	Blank for request, filled in for response file
8	Zip Code	The billing zip code
9	Street Address	The billing street address

Batch Out

The Batch Out file contains two lines per transaction. The first line is the exact same line Emerald wrote out in the Batch In file. The second line must contain at least six fields, comma delimited. Fields 1and 2 are the process date and time. Field 3 is the response code and field 4 is the response code. If the first characters of field 4 is “A” then the transactions was approved.

Domain POS

The Domain POS batch out file consists of nine fields, each delimited by a comma.

Batch In

#	Description	Details
1	Credit Card Number	The credit card number13-16 numeric digits

2	Credit Card Expire	four numeric digits in the form mmyy
3	Amount	The amount of the transaction
4	AVS	The billing Address Verification numbers
5	Zip Code	The billing zip code
6	Credit Card Auth Name	The name on the card
7	Transaction ID	The transaction ID
8	Tax	Always 0.00

PC-Transact_IT

The PC-Transact_IT uses a set length, non-configurable batch file for both batch in and batch out. This file format is fairly extensive and covered in detail in the PC-Transact_IT user manual.

PC Authorize

The PC Authorize batch out file consists of eleven fields, comma delimited

Batch In

#	**Description**	**Details**
1	Transaction ID	The Transaction ID
4	Credit Card Number	The credit card number13-16 numeric digits
5	Credit Card Expire	four numeric digits in the form mmyy
6	Credit Card Auth Name	The name on the card
7	AVS	The billing Address Verification numbers
8	Zip Code	The billing zip code
9	Amount	The amount of the transaction.
10	CustomerID	The MBR's ID in Emerald
11	InvoiceID	The Invoice's ID in Emerald

Batch Out

The Batch Out file must contain seven fields, comma delimited. Field 1 is the transaction ID, Field 3 is the response code, and field 4 is the approval code. If the first character of field 4 is "A" the transaction was approved.

Generic

The Generic batch out file consists of six fields, each comma delimited. This is designed to be used by a system that isn't compatible with one of the previously listed formats.

Batch In

#	**Description**	**Details**
1	Transaction ID	The Transaction ID
2	Credit Card Number	The credit card number13-16 numeric digits
3	Credit Card Expire	four numeric digits in the form mmyy
4	Amount	The amount of the transaction.

5	Zip Code	The billing zip code
6	Address	The billing address

Batch Out

The Batch Out file must contain at least six fields, comma delimited. Field 1and 2 is the process date and time. Field 3 is the response code, and field 4 is the approval code. The Transaction ID is field 5. If the first character of field 4 is "A" or field 3 starts with "AUTH/TKT" the transaction was approved, otherwise the transactions was denied.