Emerald

Administrator's Guide
Version 5.0.85

Emerald Management Suite
IEA Software, Inc.

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Preface

The Emerald Administrator's Guide is designed to provide detailed technical information for those installing, configuring, and administering the Emerald Management Suite. This technical manual complements the Emerald User's guide. It is recommended that you read the material presented within the Emerald User's guide prior to attempting to administer the Emerald Management Suite in order to gain a thorough understanding of the configuration options available to you.

The Emerald Management Suite is designed to utilize Microsoft SQL Server or Oracle relational database package for data storage. The database package must be installed and configured outside of the Emerald Management Suite environment. The Emerald documentation offers no specific information regarding the installation, configuration, operation, or maintenance of the back-end database application. It is highly recommended that the database application documentation be available during Emerald Management Suite installation and setup. A good working knowledge of your database server will aid in understanding some portions of the Administrator's Guide.

Getting Started

The Emerald Administrator's Guide will walk you through the process of installing the Emerald Management Suite and using the Emerald Administrative options for system configuration. Each chapter includes fundamental information as well as providing step-by-step guide on using the application. The step-by-step instructions include screen shots of the application that display the information needed to complete the presented tasks. The information shown in the screen shots is generic; your screen may look slightly different at points due to the amount of information that may be currently stored within your user database.

The Frequently Asked Questions (FAQs) and Troubleshooting chapters anticipate questions, concerns or problems that you may encounter during the installation and use of the Emerald Management Suite. Additionally, Quick Tips scattered throughout the manual are designed to resolve common procedural errors or questions that may arise while using the application.

Document Conventions

The Emerald Administrator's Guide has standardized document conventions to help you locate, interpret and identify information. They are provided to show consistent visual clues and a standard key combination format to assist you while you learn and use Emerald.

Format	Representation
Bold	Menu option to be selected, icon or button to be clicked. Also used to identify key terms.
Italic	Directory or filename. Also used to emphasize a word, term or concept.
"quoted text"	This is text that you need to type. Do not include the quotation marks in your entry, but rather just the text within the quotation marks.

System Requirements

The Emerald Management Suite operates within a web environment that is based upon an integrated web server. Emerald is accessed via any standard JavaScript and CSS2 compliant browsers. Emerald requires database server access, requiring Microsoft SQL Server 2000, 2005, 2008, or Oracle 10+ to be installed and configured before the Emerald installation takes place.

The Emerald Management Suite has the following minimum system requirements that should be verified by your System Administrator before installation. The system requirements are separate from the requirements of the database server. Please note that the independent database server/client and web browser installations need only be accessible to the Emerald server and not necessarily reside on the same computer.

- WINDOWS systems
    - X86 PC
    - Windows 2000, XP, 2003, 2008, Vista/7 operating systems
    - 20 GB free hard disk space for software installation and logging
    - 256MB of available memory, more recommended
    - SQL Server 2000, 2005, 2008 or Oracle 10+
    - Standard web browser JavaScript/HTML4/CSS2

- LINUX systems
    - X86 PC
    - Linux kernel 2.6 or later
    - 20 GB free hard disk space for software installation and logging
    - 256 MB of available memory, more recommended
    - SQL Server 2000, 2005, 2008 or Oracle 10+
    - TCP/IP connectivity to RDBMS
    - Standard web browser JavaScript/HTML4/CSS2

- SOLARIS systems
    - SPARC workstation
    - Solaris operating system
    - 20 GB free hard disk space for software installation and logging
    - 256 MB of available memory, more recommended
    - SQL Server 2000, 2005, 2008 or Oracle 10+
    - TCP/IP connectivity to RDBMS
    - Standard web browser JavaScript/HTML4/CSS2

Installation Overview

Before installing the Emerald Management Suite install all necessary Database server components and ODBC drivers on the windows platform. Database connectivity is included on UNIX platforms however Oracle 10+ client access libraries must be installed on UNIX systems if Oracle is to be used. A web browser is required to perform the database installation and access Emerald.

Important:

The **changes.txt** file in the Emerald subdirectory notes all recent changes, known problems, platform-specific issues, and bug fixes that were made to the Emerald Management Suite that may not be included within the released documentation. For the latest release and information on Emerald, access **http://www.iea-software.com/docs** within your web browser. **Reading this file is especially important when performing an Emerald upgrade installation and should be carefully reviewed before proceeding.

Installation of the Emerald Management Suite itself involves performing the following three steps:

- Installation of the Emerald Server
- Creation of the Emerald database
- Configuration of the Emerald Server through the Emerald Admin options.

These installation instructions describe the installation of the Emerald server from a CD-ROM, or by first downloading it from the Internet and then installing. As part of the normal installation process, your System or Network Administrator will create and populate the default data and configuration information for the Emerald database. These tasks are outlined within this document. *Please note that the Emerald database must be created and configured before the Emerald software can be used.*

In the case that you experience problems during the installation process, please refer to the troubleshooting/FAQ section within this document, the Emerald Administrator's Guide, or contact the IEA Software Customer Support Department for further information.

Downloading Emerald from the IEA Software Web Site

All available product information, documentation, release notes, and product upgrades for access and/or download are available online from the IEA Software main web site (http://www.iea-software.com/) also provides important product information and customer support options for those who encounter problems or questions through the installation or use of Emerald. This site should be checked periodically to obtain information regarding available product upgrades and upcoming new releases.

This section briefly describes the process of downloading the Emerald Management Suite product from the IEA Software web site.

1. From within a web browser, navigate to the IEA Software download center located at the following URL:
    http://www.iea-software.com/emerald#download

2. Download Emerald5.exe without the MSDE embedded database unless you are already using Emerald /w MSDE (Emerald5DB.exe)

3. When the download is complete, the downloaded file can be executed on the chosen platform to start the Emerald installation/setup program.

Installation of the Emerald Server

The Emerald Management Suite is capable of running on multiple operating system platforms. The following sections detail the installation instructions for each supported platform.

Windows Installations

The following installation instructions will work for the Windows platform. Before installing the program, make sure that the logged in user has sufficient access rights to the drive on which you will install Emerald, including having Windows Registry read/write access.

On each installation wizard screen there will be a number of options offered on the bottom of the screen. These button options are described below:
- **Next** button will advance you to the next installation step
- **Back** button will take you back to the last installation step
- **Cancel** button will cancel the installation process

- **Reset** button will clear any settings on the current page and refresh the display

The physical installation of Emerald will not occur until the installation wizard receives the final user confirmation. Until that point, the installation configuration choices may be changed and/or cancelled without affecting your system or the machine you are installing on.

Use the following steps to install the Emerald Management Suite in a Windows environment:

1. Run the Emerald5.exe file from CD or from the temporary download directory in which it was saved. The Emerald Management Suite Installation Wizard welcome screen will be presented. Press the **Next** button to continue the installation procedure.
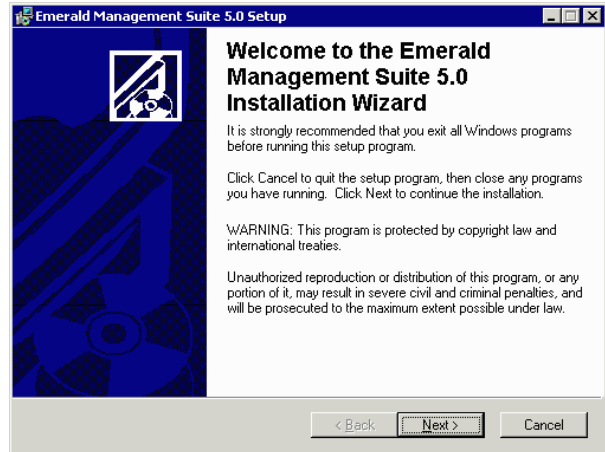
2. When the **Emerald Software License Agreement** screen appears, read the agreement by using the vertical scrollbars to the right on the screen. To accept the Emerald Software License Agreement, click the 'I accept**'** radio button and choose the **Next** button. If you do not accept the Emerald Software License Agreement, you will not be allowed to continue the Emerald Management Suite installation and you will need to cancel the installation by choosing the **Cancel** button.
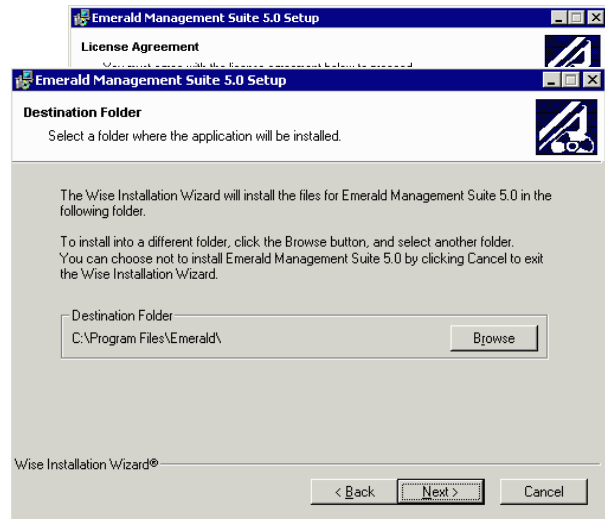
3. Choose the Emerald Management Suite destination directory by either accepting the default directory location provided, or selecting an alternative by using the **Browse** button. When entered, choose the **Next** Button.

4. Choose the Installation Type. Choose **Typical** to install the most common application features. Choose **Complete** to install all application features and documentation. Choose **Custom** to have complete control over the Emerald features and components that get installed on your system. The
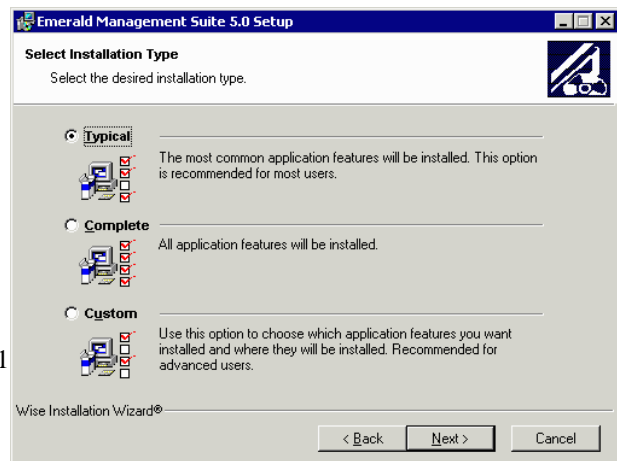
Custom option is only recommended for advanced users. It is sufficient for most users to choose a Typical installation. Once you have made your selection, choose the **Next** button to proceed.

5. Confirm your previous installation choices and proceed with the physical installation by pressing the **Next** button. To change one of your previous choices, choose the **Back** button. To cancel the installation process, choose the **Cancel** button.

   If the installation is confirmed with the Next button, the application will begin the file installation and will prompt the user when the process is complete.
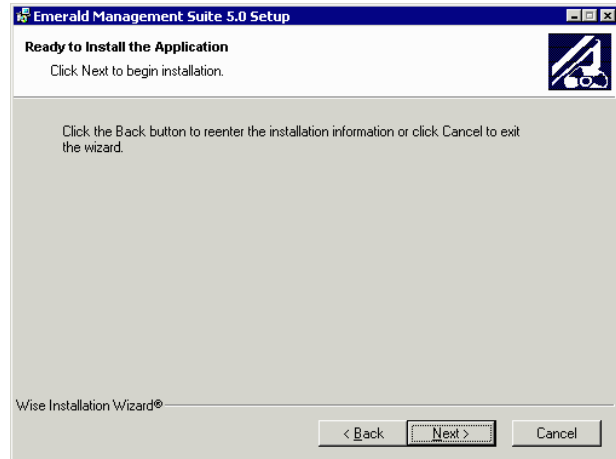
6. When confirmation of a successful install is presented, press the **Finish** button to exit the Emerald Management Suite installation wizard.

   Once the system files have been installed, you are ready for the initial configuration of the Emerald Management Suite system. Refer to the **Initializing and Verifying the Emerald Web Service** section of the document to complete the required installation/configuration tasks.

Note:

Typically, in the case of possible installation problems on the Windows platform, the installation process will end with an error display of "Install Ended Prematurely". In this case, the installation can be re-run in debug mode to obtain more details regarding the problem. To run the install in debug mode, run the installation scripts from the command line by entering: *emerald5.exe –I emerald5.msi –l* emerald5.log*. This will create an installation log file called emerald5.log. Please contact the customer support department at support@iea-software.com for more information regarding possible logging of the non-windows installation process.

If you previously had EmeraldV5 installed and have removed it, the services may still exist (with a disabled state). They will be removed when you reboot your system. You must reboot your system before installing Emerald under these circumstances, or the install will fail.

If you already have Microsoft SQL Server installed or will be connecting to SQL Server on a different server the installation will fail if you try and install emerald5db.exe which includes an embedded version of SQL Server. To correct this download Emerald5.exe (Without MSDE)

Linux Installations

The following installation instructions will work for Linux installations. Before installing the program, make sure that the logged in user has sufficient access rights to the file system on which you will install Emerald.

1. Extract the emerald5_linux.tar.gz into a temp directory.
2. Start the installer by typing "./install.pl".
3. The first screen will list a set of components you can install. To install a component, select the number of that component. Selecting the number again will deselect that component.
4. Select C to continue when the desired components are selected.
5. The files installed will scroll on the screen, with a final summary of installation status.

```
Welcome to IEA Software, Inc.  UNIX Installer v4.0

Select optional components to install from the list
by selecting the number of the option below.
Press 'C' to continue with the Installation or 'Q' to abort.

4.   [Install]          Emerald Server (4.0.18)
5.   [Install]          RadiusX (4.0.1)
6.   [Install]          Emerald task scheduler (4.0.18)
7.   [Do not Install]   Emerald LDAP sync server (4.0.18)
8.   [Do not Install]   Emerald Syslog server (4.0.18)
:
```

Once the system files have been installed, you are ready for the initial configuration of the Emerald Management Suite system.

```
Installation completed successfully.
System libraries have been installed in /usr/lib and /usr/local/iea
Database configuration file has been installed to /usr/local/iea/odbc.ini
```

Refer to the **Initializing and Verifying the Emerald Web Service** section of the document to complete the required installation/configuration tasks.

Solaris Installations

The following installation instructions will work for Solaris installations, supporting SPARC Solaris only. Before installing the program, make sure that the logged in user has sufficient access rights to the file system on which you will install Emerald.

1. Extract the emerald5_solaris.tar.gz file (from the CD or download) into a temp directory.
2. Start the installer by typing "./install.pl".
3. The first screen will list a set of components you can install. To install a component, select the number of that component. Selecting the number again will deselect that component.
4. Select C to continue when the desired components are selected.
5. The files installed will scroll on the screen, with a final summary of installation status.

```
Welcome to IEA Software, Inc.  UNIX Installer v4.0

Select optional components to install from the list
by selecting the number of the option below.
Press 'C' to continue with the Installation or 'Q' to abort.

4.   [Install]          Emerald Server (4.0.18)
5.   [Install]          RadiusX (4.0.1)
6.   [Install]          Emerald task scheduler (4.0.18)
7.   [Do not Install]   Emerald LDAP sync server (4.0.18)
8.   [Do not Install]   Emerald Syslog server (4.0.18)
:
```

```
Installation completed successfully.
System libraries have been installed in /usr/lib and /usr/local/iea
Database configuration file has been installed to /usr/local/iea/odbc.ini
```

Once the system files have been installed, you are ready for the initial configuration of the Emerald Management Suite system. Refer to the **Initializing and Verifying the Emerald Web Service** section of the document to complete the required installation/configuration tasks.

Initializing and Verifying the Emerald Web Service

During the Emerald Management Suite installation, the Emerald Web Server (Emerweb) was automatically installed and configured on your system. The Emerald Web Server is always required to be running in order to access the Emerald Management Suite. The Emerweb Service "Emerald Web Server" is pre-configured to start automatically upon system startup and will be available once the system has been restarted. *Please note that Emerald must be fully installed and the Emerald database must be created and configured before Emerald software can be used.*

By default the Emerald Web Server, once installed and initialized, will continue to run without interruption. If there is a disruption and the Web Server must be restarted, contact your System Administrator to complete the following steps to verify and restart the Emerweb service.

On Windows systems:
1. To start the Emerald Web Server, select **Web Server Debug Mode** from the Start Menu/Program Files/Emerald/Server menu.

On Linux and Solaris systems:
1. To start the Web Configuration Server, change to the /usr/local/emerald directory: "cd /usr/local/emerald".
2. Execute the command "./emerwebsrv –debug 255".

Upgrading from Emerald 4.5

This section covers important information you should know about the differences between Emerald 4.5 and version 5. Before upgrading to Emerald version 5 please take some time to read this section carefully. In addition to a significant number of new features the core Emerald system has undergone several major changes in the billing and reporting areas. To obtain a list of new features in Emerald 5 please see our web site: http://www.iea-software.com/products/emerald5_new.cfm. If you are not upgrading from a previous version of Emerald you can skip this section.

Reporting

The Crystal reports print engine and crystal report files for Emerald are no longer included with Emerald. Emerald now uses its internal template system for report rendering. This allows everyone to customize reports without the crystal viewer and improves the display of reports in mail clients and web mail clients as well as vastly improving the performance and reliability of report rendering. Emerald still supports crystal reports and if installed both reporting systems may be used simultaneously for rendering system reports such as invoices, statements and payment receipts. Crystal reports can also be used in the custom reports areas however report parameters for crystal reports are currently not supported. We currently only include statement and invoice crystal reports specifically for Emerald 5 with the main Emerald distribution. You must obtain and install crystal reports separately to use this reporting system.

Signup

The separate signup server package included with Emerald 4.5 requiring PERL and a CGI capable web server such as Apache or IIS has been replaced with an integrated signup system. Due to a fundamental shift in network access technologies the integrated signup server currently does not support auto configuration for CCK/IEAK/Gearbox dialup client software installer packages.

Web Interface

Configuration options to set interface colors, various font attributes, logos and the ability to include custom content have all been replaced by Emerald 5's theme system. Please see the Emerald 5 administrators guide on Themes for more information including a listing of style and content customization opportunities.

Billing Related

- Payments added to the system can only be changed once either to void them completely or to set a corrected amount. This policy is the same regardless of weather the payment has already been applied to a statement or not. Previously in Emerald 4.5 operators had the ability to simply delete cash or check payments that had not yet been applied to a statement however after being applied payments could not be changed at all.

- When changing an accounts service type you were previously prompted weather you would like the system to compute a pro-rate to account for any mid-term change of service. This prompt has been replaced with service type level configuration of pro-rate options for various circumstances such as switching service types, new service or closing service.

- The taxable field has been replaced with an exemption status system allowing the configuration of classes of exemptions at the tax, service type and MBR levels. The tax system has been improved to support the application of an unlimited number of taxes and location based application of tax.

- In Emerald 4.5 customers with a pay method of Credit Card or Bank Transfer who pay automatically via credit card are charged based on their statements ending balance. In Emerald 5 the automatic creation of charges for customers having a Credit Card or Bank Transfer pay method is no longer dependent upon statement creation. For this reason we recommend your billing routine in Emerald 5 be changed to make sure all CC/EFT transactions are processed before creating statements. This way any relevant CC/EFT payments are included on the customer's statement. In Emerald 5 billing groups with pending CC/EFT transactions appear in red in Emeralds Billing/Create Statements menu. Please see the Emerald 5 users guide for more information on the Emerald Billing menu.

- Pay Method surcharges are currently not supported.

- The calendar billing – billing cycle requires pay periods to be factors of 12 (pay periods of 1,2,3,4,6 or 12 months). If any other pay period is assigned to a billing cycle with calendar billing enabled - calendar billing is disabled for that service. This is a basic requirement for calendar billing as other intervals lead to multi-year drift of months within a calendar year customers are to be billed.

- Separate pro-rate adjustments are no longer created on actions such as new account creation. Instead Emerald 5 calculates any applicable pro-rates during the invoicing process. In Emerald 5 if a MBRs billing cycle changes in a way that effects the anniversary date of the MBR Emerald automatically creates pro-rates to realign accounts accordingly.

- In Emerald 5 Billing Cycle changes between balance forward and renewal cycle types will automatically set or reset account expiration fields as necessary. Previously this needed to be done manually.

- The use of Service Types to on a recurring basis apply credits to an account by setting a negative service type cost worked to some degree in Emerald 4.5 but was never intended or supported. In Emerald 5 this is not acceptable and such a configuration will cause a billing error to occur preventing the invoicing process from running. You will be warned during the upgrade if there are any service types configured with a negative cost.

- The calculation of credits on close of MBR is now a fully automated process using service and package type level configuration to calculate a final invoice/account balance. Acceptable Cancellation dates are now subject to assigned operator rights.

- New MBR Acct Admin object group required for operators to manually change account expiration and billed thru dates.

CC / EFT Processing

The global CC/ACH options for configuring credit card and ach transaction processors have been moved to the Batch Processors menu option in the Admin/Accounting menu. Please see the Emerald Administrators guide for more information on the new Batch Processor configuration. The new settings allow multiple credit card and ACH processors to be used simultaneously.

Usage Rating

The Usage rating engine and interface has been replaced. Please see the Emerald 5 Administrators guide on Rating for more information on the new system.

EmerNet / Netflow traffic collector

The EmerNet collector now uses Emeralds Real-time rating engine to aggregate and cost network flows. The use of flow filtering for traffic accounting has been replaced with the rating engine. Flow filters are no longer supported but still available. Please see the Emerald 5 network collector guide and the "Rating" section of this document for more information.

Database backup and restore

In Emerald 4.5 and some database servers you had the option of creating database backups directly from the Emerald Admin/Database menu. This option is currently only available for Microsoft SQL Server. For all other platforms you must use the tools included with your database server to perform regular maintenance and backup of your database server.

Upgrade pre-requisites

When upgrading to Emerald 5 from Emerald 4.5 you must have the following:

✓ A separate computer to install the Emerald software different from your current Emerald 4.5 production system.

✓ If the database server for Emerald 5 will be different from the existing 4.5 database server you must first backup and restore the Emerald 4.5 database to the Emerald 5 database server.

✓ You must be running the latest version of Emerald 4.5 (4.5.10) before upgrading

✓ Emerald 2.5 customers wishing to upgrade to Emerald 5 must first upgrade to 4.5 and then 5.0.

✓ At least as much disk space available on the database server as is currently allocated for your existing version of Emerald 4.5.

Upgrading Emerald

The upgrade process creates a new database for Emerald 5 copying all existing Emerald 4.5 data into the new database. This process does not alter the source Emerald 4.5 database but may adversely affect system performance for the duration of the upgrade process.

To upgrade Emerald follow the steps outlined in the "Initial Database Configuration" section below. When creating the Emerald 5 database in step 9 choose your existing Emerald 4.5 database from the "Convert Emerald 4.5 database" selection list and choose the type and quantity of call records you would like copied into the new Emerald 5 system.

Post upgrade checklist

After the database creation process has completed login to Emerald using a global administrator operator account. Upon login enter the Emerald 5 license key you were provided with as prompted and choose the 'Client' menu option from the Administrative menu. You will be prompted to continue with the upgrade process by clicking the link entitled "I am in the process of upgrading to Emerald 5 and wish to continue". This process may take anywhere from a few minutes to several hours depending on database performance, the number of MBRs and the amount of billing history within each MBR. After this process has completed successfully you may begin using the new version of Emerald. If the process does not complete successfully re-run it by following the link provided. If this process still will not complete successfully report the full text of the error(s) displayed to your support representative.

Emerald 4.5 alternate time and alternate data rates for RADIUS call rating are not converted automatically to Emerald 5. If you are using alternate rates you will need to manually configure them via the "Admin" / "Rating" / "Rate Rules" / "Configuration" menu. See the "Rating" section in this document for more information. This configuration must be done if necessary before enabling rating from the RadiusNT/X administrator.

No Emerald scheduled tasks are brought over from Emerald 4.5. Instead a default set of scheduler tasks are installed with the new Emerald 5 database. All automatic invoicing, statement creation, CC/EFT batching and emailing of invoices and statements are disabled initially. You may enable these tasks as necessary from the "Admin" / "Scheduler" / "Configure Schedules" menu.

Those previously using the Email notification add-on to Emerald 4.5 will need to manually create and schedule the Emerald 5 versions of these notices from the "Admin" / "General" / "Notices" menu. See the "Notices" section below for more information.

Initial Database Configuration

If installing Emerald on the windows platform using the embedded database server included with Emerald (Emerald /w MSDE - Emerald5DB.exe) you may follow the Emerald + MSDE Quick install guide located in the Emerald/Docs program group or at the following Internet URL: http://www.iea-software.com/docs to install the initial Emerald database. If you are not using MSDE or are upgrading from a previous version of Emerald the quick install guide does not apply to you. For new installations of Emerald if you do not have a database server it is recommended you obtain SQL Express edition from Microsoft's web site and install Emerald without MSDE. This will provide you with a much larger database size limit and database management tools not included with Emerald /w MSDE.

Once the Emerald Server installation is complete and the Emerald Web Server has been initialized, the Emerald System Administrator must configure the system. Configuration of the system includes the creation and population of the Emerald database and performing the user configuration of the Emerald billing and system options. The database configuration activities are detailed within this section and are performed by the Emerald Administrator. The Emerald Administrator must perform these steps, as well as verify the independently installed database server and client configurations, before the Emerald Management Suite can be used.

Regardless of operating system platform, each installation requires the initial creation and configuration of the Emerald database performed with the Emerald Web Configuration Server. The steps required to complete the initial configuration of the system are described below.

1. Start the Emerald Web Configuration Server.
   On Windows systems:
   a. To login to the Web Configuration Server, select **Web Config** from the Start Menu/ Program Files/Emerald menu.

   On Linux and Solaris systems:
   a. Open a web browser and go to the URL: http://127.0.0.1/settings.

2. If this is the first time that the Configuration Server has been started, you will initially be prompted to enter a **Password** and confirm the password value by entering it again. The Web Configuration password entered will only be valid for the Emerald Web Configuration Server (not for the Emerald application itself). There is no default username or password when the Web Configuration Server is initially started.

   After you have created the Web Configuration Server password, you will be prompted again for a Web Configuration Server username and password to login. The username is insignificant, and the password is the password you initially set up for the Configuration server above.

Note:

> The password configured for the Web Configuration Server is shared among all the Emerald Management Suite Configuration Server Administrators (Emerald Web Configuration Server, RadiusNT Administrator, EmerAuth Administrator, etc.), meaning that all Administrators running on the same machine will use the same password once it has been established. Because it is locally configured, the password is machine-specific. If the password is forgotten, it can be located by following the instructions below. If the WCPassword entry is cleared as described below, you will be prompted to provide a new password upon the next Web Configuration Server start-up.
>
> On Windows machines: Use the Registry Editor to look up the value under the Registry value for WCPassword under HKEY_LOCAL_MACHINE\Software\IEA\Common. You can clear the value within the Registry Editor, but the web server must be stopped and restarted in order for the changes to take effect.

On non-windows platforms the value can be found within the /usr/local/iea/common.ini file. The existing password is cleared by removing the "WCPassword = " line.

Once the Emerald Web Configuration Server has been launched, choose the **Create Database** Menu option to the right of the welcome screen. **Note:** Upgrade installations must also create a *new* Version 5.0 Emerald database (your existing data will be copied into and converted into the new database during upgrade).
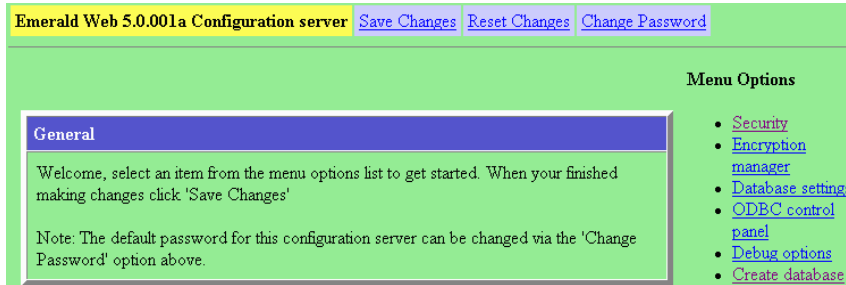
3. Within the Create Database screen, you are prompted to configure the Emerald data source information to establish ODBC connectivity to your database server. To create the Emerald database, choose the 'New' option from the **Emerald datasource** pick list and then press the **Continue** button.
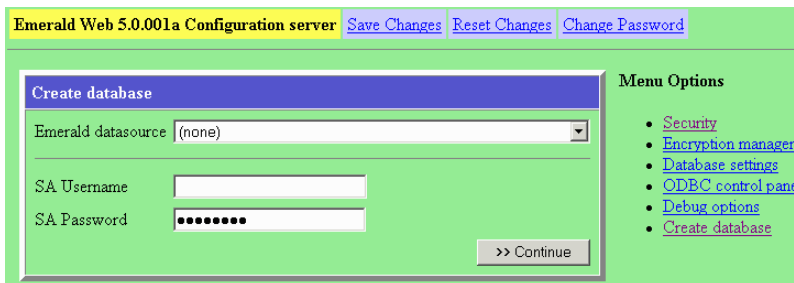
4. On the ODBC control panel screen, enter "Emerald5" in the **Create new datasource** field. Alternatively, you may select an existing datasource to edit from the **Edit existing datasource** pick list. Press the **Continue** button when finished.
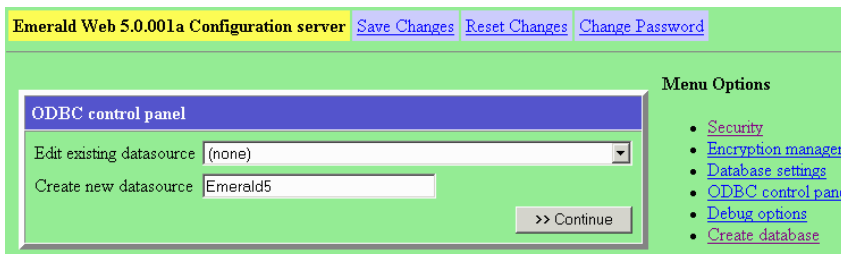
5. Choose the appropriate type from the **Database type** pick list. This indicates the type of database server installed on your site that will run against the Emerald server. Typically your choice will be a Microsoft SQL or Oracle selection. Press **Continue** when done.
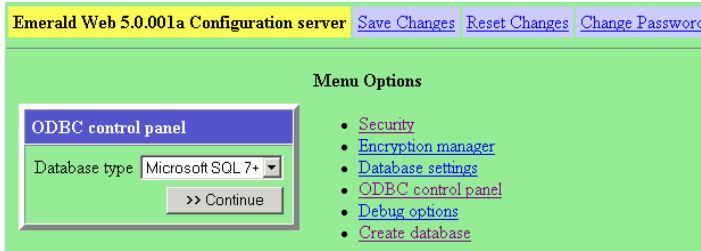
6. The next step is to describe the new Emerald data source and provide server information. Enter the following information on the fields provided:

Field	Description
Datasource description	Enter a description for the datasource. Generally, this will be the datasource name 'Emerald5'.
Server name	Enter the name of the server in which your database server resides. Note: For UNIX versions the server name is the IP Address of your database server followed by ',' and it's TCP port number. Example: 10.0.0.35,1433
Trusted connection	Choose Yes or No from the pick list indicating whether your database server will be accepting a Trusted connection, or using the SA username/password information for Emerald access.
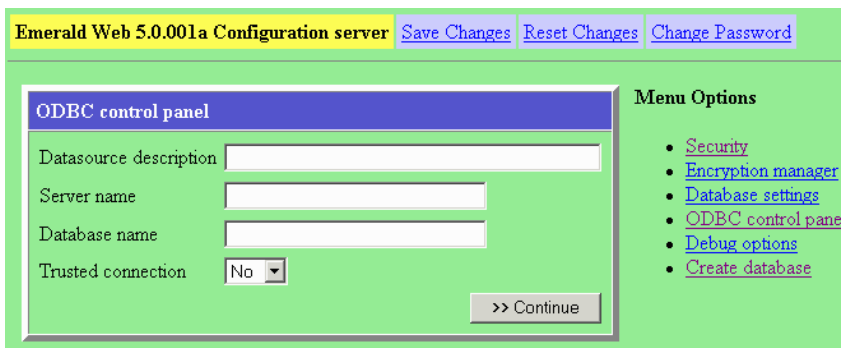
Once the information has been entered, press the **Continue** button.

7. If the datasource is not configured to use a trusted connection, the datasource will require the system administrative (SA) username and password to set up access to the database server. Enter the following field values and press the **Continue** button to complete the creation and configuration of the Emerald datasource.

Field	Description
Emerald data source	Choose the Emerald datasource name, typically 'Emerald5', from the data source pick list.

| SA Username | Enter the system administrator username configured on your database server. |
| SA Password | Enter the system administrator password configured on your database server. |

8.   The next step in the database configuration is to actually physically create the Emerald database that will store the account and system information. On the Create Database screen, choose to **Create a new database** by entering 'Emerald5' as the database name in this field and pressing the **Continue** button.

9.   Continuing on with the Create Database task, this screen is used to identify information for your existing database server, and indicate if a data upgrade from a previous Emerald version installation is required.

Field Descriptions are provided below. Some fields may not be available depending on the database server used.

Field	Description
Device name	Choose a name for the data device for your Emerald database. The default provided is Emerald5_data.
Device filename	Enter the physical filename and directory path of where the database file is to be installed locally on your database server. This directory path must already exist.
Device size	Enter the initial database file size of the database to be installed on your database server. Refer to your database server user documentation to determine the appropriate default value. As a general rule of thumb you will need about 50MB per 1000 MBRs.
Log name	Choose a name for the Emerald5 database log.
Log filename	Enter the physical filename and directory path of where the log file is to be installed on your database server.
Log size	Enter the initial log file size to be installed on your database server. Refer to your database server user documentation to determine the appropriate default value. As a general rule of thumb this should be about 1/5 of the size of your Device size.
Convert Emerald 4.5 database	Select from the existing databases listed within the provided pick list to indicate the Emerald 4.5 database to be converted into the Emerald 5 format. This option will automatically perform the data conversion necessary to upgrade your existing Emerald 4.5 data into a format compatible with the new Emerald 5 application. Note: The database conversion will leave the Emerald 4.5 database intact, performing the conversion by creating a new Emerald 5.0 database (therefore a new database name is required, created as 'Emerald5') and copying the data into the converted format from the old database to the new database.
Copy Call History	Specifies the range of call records from the Emerald 4.5 database to import into the new Emerald 5 database.
Call type	Specifies the call record types from the Emerald 4.5 database to be imported into the new Emerald 5 database. "Stop only" records are generally sufficient for all usage and

	reporting purposes.
Create Emerald SQL DB user and Password	These fields indicate the user and password used for access to the new Emerald database. These fields should be set to allow the Emerald server to connect to the database server specified previously.

After the field values have been entered, press the **Continue** button to initiate database creation and population.

As the database creation and conversion occurs, the following screen will be displayed showing the progress of the database creation. Once the process has completed successfully, the message "Emerald database installation complete" will be displayed at the bottom of the status screen.
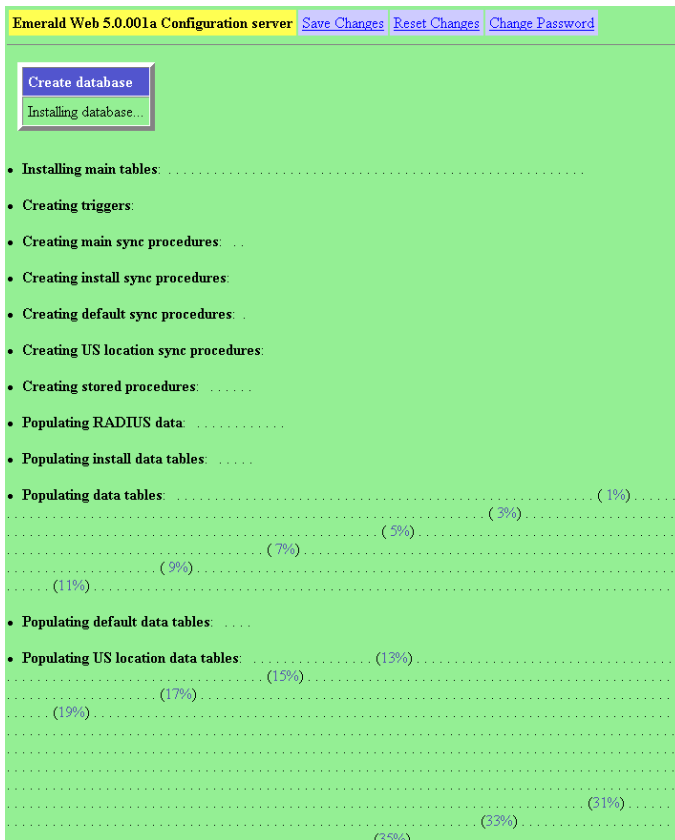
Quick Tip:

> It is recommended that if an Emerald 4.5 data conversion has occurred, that the data populated within the new Emerald 5.0 database be verified for accuracy before continuing. In the unlikely case that data inconsistencies are discovered, do not try to manipulate the data directly. Please contact the IEA Software Customer Support team for assistance.

Emerald for Linux /w Oracle 10g special instructions

The following information is specifically for installing the Linux edition of Emerald with an Oracle database together on the same server.

STEP 1. To start obtain and Install Emerald for Linux and Oracle 10g or later. Follow the instructions above for installing Emerald for the Linux platform. Oracle XE (Express Edition) is available from the Oracle web site: http://www.oracle.com/technology/products/database/xe/index.html

If using XE you MUST install the Western European version in order for Emeralds multi-lingual interface to function properly. If not using XE the ORACLE database server should be configured with an WE8ISO8859P1 or WE8MSWIN1252 character set.

Be sure the ORACLE_HOME environment variable has been added to the systems startup profile. This is required in order for Emerald to access the Oracle database.

To set the ORACLE_HOME environment variable copy the file 'oracle_env.sh' from the oracle bin folder to the /etc/profile.d DIRECTORY.

If the /etc/profile.d DIRECTORY does not exist append the following two lines to the file /etc/profile :

ORACLE_HOME=/path_to_my_oracle_directory (ie. /usr/lib/oracle/xe/app/oracle/product/10.2.0/server) export ORACLE_HOME

STEP 2. Download the instant client package and instant client ODBC driver zip files version **10.2.0.3** from the Oracle web site: http://www.oracle.com/technology/software/tech/oci/instantclient/htdocs/linuxsoft.html

Unzip both the client and ODBC driver files into the same temporary folder and move all lib* files found in the instantclient directory into the /usr/local/iea folder.

STEP 3. Reboot the system.

STEP 4. Using a web browser connect to the Emerald configuration server typically http://localhost/settings From the ODBC menu add a new datasource labled Emerald5.

If you've installed Oracle Express set the server name to 'xe' otherwise it should reflect the service name (SID) of your Oracle server configured via the Oracle net manager.
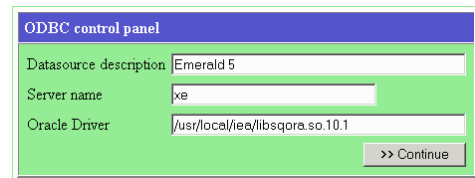
The default Oracle driver should reflect the name of the libsqora.so.* file copied to the /usr/local/iea folder in STEP 2 above.

STEP 5. From the Create Database menu within Emerald enter the Emerald5 datasource created in STEP 4 and the Oracle account login and password you want to create the Emerald database using, click continue to create the Emerald database. This process may take several minutes to complete. Once the database has been created successfully move on to STEP 6 below.
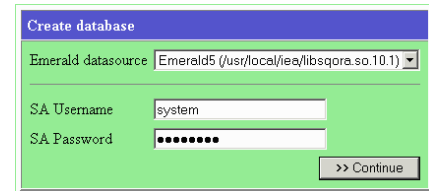
STEP 6. From the Database settings menu configure the Emerald5 datasource as the main read/write datasource and enter the login and password used in STEP 5 to create the database. Click continue and save changes. The Emerald server should now be started. Browsing to http://localhost displays the main Emerald login page.

The Emerald Web Configuration Server

The Emerald Web Configuration Server was used during the installation process to install and configure the Emerald 5.0 database for the Emerald Management Suite. Although installation is the primary reason to use the Emerald Web Configuration Server, there are times where it may necessary to modify the Emerald configuration such as changing the database information, ODBC configuration and/or change the administrative operator passwords. The Emerald Web Configuration options are available any time by starting the Web Configuration Server by doing the following:

1. Start the Emerald Web Configuration Server.
   On Windows systems:
   a. If the Emerald Web Server is not started, select **Web Server Debug Mode** from the Start Menu/Program Files/Emerald/Server menu.

b. To login to the Web Configuration Server, select **Web Config** from the Start Menu/ Program Files/Emerald menu.

On Linux and Solaris systems:
a. If the Web Configuration Server is not started, change to the /usr/local/emerald directory: "cd /usr/local/emerald" and execute the command "./emerwebsrv -config".
b. Open a web browser and go to the URL: http://127.0.0.1/settings.

2. When prompted, enter a **Username** and provide the general Configuration **Password** provided during installation and initial start of the Web Configuration Server (or other Emerald Management Suite Administrator). The creation and access of this password is described above in the **Initial Database Configuration** section above.
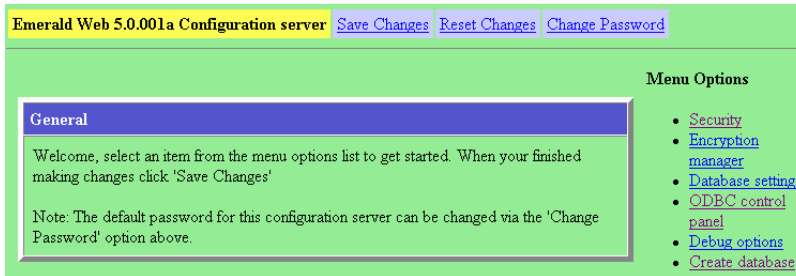
Emerald Printing Configuration

On all operating system platforms

Emerald Printing and Preview features may rely on the processing of PDF documents when the crystal report engine and crystal reports are available. Therefore, a PDF Viewer or Plug-in should be installed on all Emerald Client machines if using crystal reports. Please go to http://www.adobe.com for more information regarding the download and installation of the Adobe PDF Viewer. The Emerald report engine included with Emerald 5 does not require a PDF viewer.

Secure Socket Layer (SSL) Configuration

The Emerald Server natively supports SSL (Secure Socket Layer) transactions. To enable SSL support, enter a port for the SSL connection to listen on in the Security section. A sample non-trusted certificate labeled IEA Software, Inc is included, however you will most likely want to obtain or generate your own certificate especially if allowing customer access to Emerald. Use of the included well known private key and certificate allows the SSL connection to be easily decrypted or compromised by others.
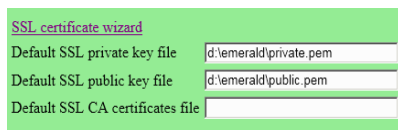
A comprehensive certificate management wizard is provided to assist with all key management tasks including creating private keys, certificate signing requests (CSRs), options for self-signed certificates and key validation. This wizard is accessed from Security menu of Emerald configuration server.
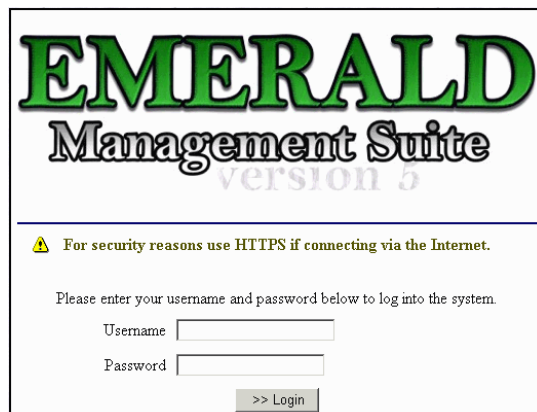
Launching and Logging on to Emerald

To start exploring Emerald's features you need to launch it within a web browser. To launch Emerald, do the following:

1. To login to the Emerald server using your default web browser do the following. On Windows systems, select **Web Login** from the Start Menu/ Program Files/Emerald menu.

   On non-Windows systems, start a web browser and go to the URL: http://localhost Your System Administrator configured the Emerald site location during the Emerald server installation.

2. Emerald Management Suite login screen, enter your Emerald operator **Username** and **Password** and click on the **Login** button, or just press the **Enter** key. The Emerald System Administrator configures valid username and passwords, as well as assigning individual operator privileges, during system installation and configuration.

   Note: The first time you log into the Emerald Suite after installation, use the default Username and Password values '**admin**' and '**pass1**', respectively. These values are supplied as the administrative login by default during installation. *It is required the default Emerald Administrative account password be changed immediately upon initial login to the system.*

Note:

It is critical for the operation of the Emerald Management Suite that *cookies*, *java script and popups* be enabled within all web browsers accessing the Emerald Server.

Overview: Emerald Administrative Options

The Emerald Administrative options are used to configure the billing and account selections available throughout the Emerald Management Suite, as well as configure the general settings for the system environment and RadiusNT/X component.

General	Pre-Paid	Sales	Rating	Resellers	Client
Services	RADIUS	Accounting	Reports & Logs	Incidents	Apply
Scheduler	Web Interface	Security	Advanced	Database	Logoff

The following gives a description of the main Administrative options and what types of system settings they are used to configure:

- **General**: Used to configure the available options for MBR and Service account general informational fields including Domains, Billing Groups, Service Groups, Custom Data, Regions, SMTP, FTP, Address Types and Notices.

- **Pre-Paid**: Provides for the creation and management of prepaid access cards. The prepaid menu includes configuration of Sequences, Batch Types and Prepaid Batches.

- **Sales**: Used to define sales staff, sales related reporting and commissions. The Sales menu includes the definition of Sales Persons, Referrals, Cancel Reasons and Commissions.

- **Rating**: Provides for the management of usage-based rating of call records, network flows as well as third party data. The Rating menu includes the definition of Rates, Rule Sets, Time Sets, Rate Classes, Intervals and Data Sources.

- **Resellers**: Used to define multi-organization grouping and reseller configured service pricing. The Resellers menu includes the definition of Organizations, Billing Groups and Service Pricing.

- **Accounting**: Used to configure the available options for most billing related settings for MBR and Service accounts including the definition of available Charge Types, Pay Periods, Taxes, Tax Exemptions, Discounts, Billing Cycles, Send Methods, GL Codes, Batch Processors, Late Fees and One Time Charges.

- **Services**: Used to configure service type related options including defining Service Types, Custom Data, External Systems and Package Types.

- **RADIUS**: Used to configure the integrated RadiusNT/X environment. This is the means to configure the RadiusNT/X application when it is used in conjunction with the Emerald Management Suite (Note: Local RADIUS Server configuration is still required to be performed through the RadiusNT/X Administrator). The RADIUS menu includes the configuration of Vendors, IP Groups, IP Service Types, Server Types, Server Groups, Roam Servers, Roam Domains, Reject Attributes, DNIS Groups, Filter Groups, Group Concurrency, Clear Online List and Auth Test Config.

- **Reports & Logs**: Provides for the configuration of reports and the management of Emerald related logs. This menu includes the configuration of Reports, Report fields, Log trimming and Syslog filtering.

- **Incidents**: Used to define Emeralds CRM related features for the management of Incidents. This menu includes the configuration of Incident Types, Incident States, State Groups, Operator Roles and Priorities.

- **Scheduler**: Used to define the Emerald auto-scheduled tasks and view the status of the completion of those tasks. Scheduled tasks range from system actions to billing processes.

- **Security**: Used to configure Emerald system security including the definition of Emerald operators, operator groups and their system privileges, IP group restrictions, group rights and database sensitive field encryption.

- **Web Interface**: Used to configure Web Interface and related Emerald system options. This menu includes viewing Active Sessions and configuring of Themes, Signup Servers, Web Links, Client Settings, Operator Limits, Operator Settings, Customer Settings, License Keys and Languages.

- **Advanced**: Used to make changes to internal data and advanced features required for Emerald to operate or extend Emeralds functionality. Options in the advanced menu should not be changed without direction from support staff.

- **Database**: Used to manage basic database functions, including running a query and seeing the current database activities.

- **Client**: Returns you to the Emerald Management Suite Home page and Emerald Client options.

- **Apply**: After changes are made in the Emerald Administrator this option ensures the changes are made active by reloading internal configuration and data caches as well as pushing reconfigure requests out to remote instances of RadiusNT/X and the Emerald task scheduler.

Typically, configuration of the Emerald Management Suite is best approached by sequentially navigating the Administrative menu options from left to right. Some administrative options are dependent upon other administrative options being populated prior, such as Billing Groups that are referenced throughout many of the administrative options for both option grouping and security. The following sections describe all the Administrative options in detail.

General Configuration

The **General** configuration option under the Emerald Administrative menu is where most of the Master Billing Record and Service account informational field selections are defined. The General options work closely with the administrative Accounting options that additionally define MBR and Service account selections. The General configuration options are presented below.

Domains

Emerald Domains represent Internet domains. The Internet domains that your

organization is affiliated with should be defined as the minimal Emerald Domain entries, but any number of Internet domains may be defined. All defined Emerald Domains will be available as selection options within the Service

account screen, and can be used to determine default email addresses on Service entries.

Choosing the **Domains** General Administrative option will present the display of all existing Emerald Domain entries, as shown above. Retrieve a domain entry for view and/or edit by clicking on the desired entry. To remove a domain, click the Delete link next on the selected entry. To add a new domain, click the **New Domain** link. The Domain entry fields are described below. Press the **Update** button to save the new or modified Domain entry.

Domain	Choose a name for Emerald to reference the domain.
Mail Domain	Enter the full Internet domain address, such as "iea-software.com".
Description	Enter a short domain description, or note of comment.
Billing Group	Select an existing Billing Group from the provided pick list to associate this domain with. If a Billing Group is selected, only MBRs from this Billing Group will have the option to assign this domain to their Service accounts.
Service Group	In addition to Billing Groups, this domain is also accessible to service groups that include "Domain".
Customer	When 'Yes' this Domain is available for selection by the end user when adding a new account via the

Access	manage accounts menu within the customer account center. Note: In order for users to be able to choose domains the service type must have the 'Allow Customer Set Domain' package permission enabled.
Sort Order	Enter a numeric value to indicate the display order of this Domain entry. The sort order is used to sort the entries from lowest to highest numerical order.
Domain Owner MBR	Setting a domain owner enables only the specified MBR to use this domain when adding new services to the MBR. When a Domain owner is chosen the Domain cannot be used by any other MBR or as a default setting for Billing Groups, Signup Servers and Prepaid cards. If a Domain is already used as a default it is unavailable to be assigned to a specific MBR and the Domain Owner dialogue is not shown.

Note:

In general, throughout the Emerald Administrative options, once an option has been assigned, there is no longer the option to delete the entry. This guarantees the integrity of the Emerald data by not allowing values in use by other parts of the system to be removed. For example, once a Domain has been assigned to an MBR Service account, that Domain entry can only be removed if the MBR Service account Domain value is re-assigned to a different value.

Billing Groups

A **Billing Group** defines a set of MBRs that have billing characteristics in common. Billing Groups are important to Emerald's configuration because

New Billing Group	Edit Group Defaults						
		Billing Groups					
Name	Org	Domain	Inv Print	Inv Text	Stmt Print	Stmt Text	
ISPs	IEA Software, Inc	ISP	Default	Default	Default	Default	Delete

they allow different billing features and options to be designated to only a specific group of MBRs, or the billing options can remain global and apply to all MBRs. The Billing Group assigned to an MBR is very important because it can affect the choices available for many field selections on MBR and Service account entries. There are many Emerald configuration options that can be associated with a Billing Group that will restrict and/or cause default behavior for members assigned to that group. These dependencies are described within this section.

Choosing the **Billing Group** General Administrative option will present the display of all existing Emerald Billing Groups, as shown above. Retrieve a billing group entry for view and/or edit by clicking on the desired entry. To remove a billing group, click the Delete link next on the selected entry. To add a new billing group, click the **New Group** link. The Billing Group entry fields are described below

Organization	Organization the billing group is to be associated with.
Default Domain	Choose a default domain for this Billing Group. When the Billing Group is later assigned to an MBR, the domain specified here will be supplied as the default domain value on the MBR Service account screen (the default may be over-ridden) and can subsequently also be used to determine user default email addresses.
Customer Theme	If a theme is selected the chosen theme is preferenced when an end user within this group logs into the customer account center. The setting does not apply to the signup server or operator interface.
Name	Choose a name for Emerald to reference the billing group.
Description	Enter a short billing group description, or note of comment.
Report Logo URL	For HTML rendered reports this sets a remote image URL for display on customer invoices, statements and some custom reports.
Invoice Report	Select the report format to use for the generation of mailed/printed invoices for MBRs of this billing group. This option allows customization of invoice format per billing group. If no Invoice Report is provided, the general Billing Group Default Invoice Report will be used for this Billing Group.
Invoice Text Report	Select the report format to use for the generation of emailed invoices for MBRs of this billing group. If no Invoice Text Report is provided, the general Billing Group Default Invoice Text Report will be used for this Billing Group..
Statement Report	Select the report format to use for the generation of mailed/printed statements for MBRs of this billing group. This option allows customization of statement format per billing group. If no Statement Report is provided, the general Billing Group Default Statement Report will be used for this Billing Group.
Statement Text Report	Select the report format to use for the generation of emailed statements for MBRs of this billing group. If no Statement Text Report is provided, the general Billing Group Default Statement Text Report will be used for this Billing Group..

Global Options	Choose 'Yes' to allow MBR field selections for this billing group to include Global options, as well as the options specific to the billing group. Choose 'No' to restrict the MBR field selections to only those specifically set up for this billing group.
Allowed Pay Methods	Controls those pay methods available to MBRs within this billing group.
Visible MBR Fields	When editing an MBR that is a member of this billing group the visibility options control which fields are displayed in the MBR edit form.
Sort Order	Enter a numeric value to indicate the display order of this Billing Group entry. The sort order is used to sort the entries from lowest to highest numerical order when the Billing Group entries are presented in selection pick lists throughout Emerald. A negative sort hides the billing group from availability.
Active	Intended to temporarily disable network access for all services within the billing group.
FTP Directory	Enter the physical directory path to be assigned to the MBR Service accounts associated with this Billing Group.
Billing Group Company Details	Provide the Company name and address information to use for this Billing Group's billing document generation and distribution. This option provides the ability to track company name and address information associated with external entities that you have established as Emerald Billing Groups.
Email From	Enter the email address from which billing items are to be sent from (identifies the sender to the email recipient) for members of this Billing Group.
Email Subject	Enter the subject that should be included on all emailed billing correspondence for members of this Billing Group.
Email Invoice	This setting specifies how Invoices are sent via email for all MBRs within the billing group having an email send method. When set "Send Automatically" Invoices will be emailed when emailing "All" billing groups from the "Client" / "Billing" / "Send Bills" menu or automatically when scheduled via the Emerald task scheduler. When set "Send Manually" the specific billing group must be selected from the "Client" / "Billing" / "Send Bills" menu. When set "Sending Disabled" its not possible to email invoices automatically for a billing group however individual invoices can be emailed manually from the MBRs invoices menu.
Email Statement	This setting specifies how Statements are sent via email for all MBRs within the billing group having an email send method. When set "Send Automatically" Statements will be emailed when emailing "All" billing groups from the "Client" / "Billing" / "Send Bills" menu or automatically when scheduled via the Emerald task scheduler. When set "Send Manually" the specific billing group must be selected from the "Client" / "Billing" / "Send Bills" menu. When set "Sending Disabled" its not possible to email statements automatically for a billing group however individual statements can be emailed manually from the MBRs statements menu.
Invoice Batch Printing	When set "Hide Pending" any invoices that are pending for printing for postal delivery from the Emerald billing / send bills menu will not be displayed for this billing group. Setting "Hide Pending" is useful for situations where only statements are mailed out to the end user and invoices only need to be printed manually from each MBRs invoicing menu. When set "Show Pending" any invoices pending for printing for postal delivery for the billing group is displayed in the Emerald billing / send bills menu.
Statement Batch Printing	When set "Hide Pending" any statements pending for printing via postal delivery from the Emerald billing / send bills menu will not be displayed for this billing group. Setting "Hide Pending" is useful for situations where only invoices are mailed out to end users and statements only need to be printed manually from each MBRs statements menu. When set "Show Pending" any statements pending for postal delivery for the billing group is displayed in the Emerald billing / send bills menu.

Press the **Update** button to save the new or modified Billing Group entry.

Configuring General Billing Group Default Values

There are general Billing Group Defaults that may be automatically applied over all Billing Group entries. If one of the Billing Group field values is not explicitly defined for an individual Billing Group, the defined "Default" field value will be accepted and applied for the entry.

Configure the Billing Group Defaults by pressing the **Edit Billing Group Defaults** link on the Billing Group main screen.

Restricting Accounting options to a specific Billing Group

Emerald allows restricting certain Accounting and Global billing options to a specific Billing Group. Once associated to a specific Billing Group, that option will only be available to MBRs of that Billing Group, or those under a Billing Group with Global options.

Once one of the following types of Accounting or Global option entries has been created, it can be individually associated to a particular Billing Group: Service Type, Region, Billing Cycle, Pay Period, and Discount. A Billing Group can have any number of billing options associated with it. The Billing Group assignment is performed on the particular option entry screen by selecting a Billing Group from the presented Billing Group pick list, an example using the Region option is shown to the right. If the default 'All Groups' option is selected on the option screen, the option entry will remain available to all MBRs, regardless of Billing Group.

On new and existing Billing Group entries, you may find a message displayed within the group entry indicating, for example: 'No Service Type assigned to this group'. This is a status message indicating that no specific options of this type (for example: Service Type, Billing Cycle, Region) have been restricted to this Billing Group. This is just an informational message and requires no action, as it is not mandatory to restrict any options to a specific Billing Group.

Regions

Emerald Regions are generally geographical areas that indicate the different areas where your organization provides its services. Emerald Regions are informational only

however they may also influence taxes assigned to accounts (See Tax Groups) and are used primarily for reporting, grouping, or external integration purposes only.

Choosing the **Regions** General Administrative option will present the display of all existing Region entries. Retrieve an existing Region for view and/or edit by clicking on the desired entry. To remove a Region, click the Delete link next on the selected entry. To add a new Emerald Region, click the **New Region** link. The Region entry fields are described below.

Region	Choose a descriptive name for Emerald to reference the Region.
Billing Group	To restrict this option to only be available to MBRs of a particular Billing Group (and Billing Groups with Global Options), select the desired Billing Group from the presented pick list. If the default 'All Groups' option is accepted, the Region will remain available to all MBRs, regardless of Billing Group.

Service Group	In addition to Billing Groups, this region is also accessible to service groups that include "Region".
Sort Order	Enter a numeric value to indicate the display order of this Region entry. The sort order is used to sort the entries from lowest to highest numerical order when the Region entries are presented in selection pick-lists throughout Emerald.

Press the **Update** button to save the new or modified Region entry.

Quick Tip:

Regions may be used for many different grouping purposes, rather than just geographical.

MBR Custom Data Fields

The **Master Custom Data Fields** option allows you to define extra fields of information that your organization would like to track for each MBR, or each MBR of a specific Billing Group, within Emerald. The extra MBR data fields chosen here will be presented within the MBR detail display and MBR edit form allowing the Emerald operator to optionally enter a value for each of the additional MBR data fields. MBR Custom data fields are informational only and are used by Emerald for reporting and tracking purposes only.

Choosing the **MBR Custom Data Fields** General Administrative option will present the display of all existing MBR Custom Data Field entries. Retrieve an existing Data Field entry for view and/or edit by clicking on the desired entry. To remove a Data Field, click the Delete link next on the selected entry. To add a new Data Field, click the **New Field** link. The MBR Custom Data Field entry is described below.

Data Field	This entry will be displayed as the label for the Custom Data field on the MBR account entry screen. Available data fields are configured from the "Admin" / "Advanced" / "Acct Data Fields" menu.
Billing Group	If the MBR custom field is only to be tracked for MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'All' Billing Group default is accepted, the MBR custom field will apply to all Emerald MBRs.
Required	Requires an operator to enter a value for this custom data field before they are able to save changes to the MBR.
Sort Order	Enter a numeric value to indicate the display order of this Incident State entry. The sort order is used to sort the entries from lowest to highest numerical order when the data types are displayed.

Press the **Update** button to save the new or modified MBR Custom Data Field entry.

Address Types

The **Address Types** option allows you to define additional contact and/or address

Address Types	
Address Type	
Shipping Address	Delete
Normal address field	Delete
Email address	Delete

information that your organization would like to optionally track for each MBR account. The extra Address Types defined here will be presented within the **Addresses** section of the MBR account entry screen options, allowing the Emerald operator to optionally enter a value for each of the additional Address Types specified.

Choosing the **Address Types** General Administrative option will present the display of all existing Address Type entries. Retrieve an existing Address Type entry for view and/or edit by clicking on the desired entry. To remove an Address Type, click the Delete link next on the selected entry.

To add a new Address Type, click the **New Address Type** link. The Service Custom Data Field entry is described below.

Address Type	Enter a description of the Address Type. This entry will be displayed as the label for the Address option on the MBR account Addresses entry screen.
Allowed Fields	Checked fields are displayed when an operator manages an address entry of this type. Fields that are not checked are hidden from view.
Required Fields	A comma separated listing of required fields. The following field names are available to choose from: FirstName, LastName, Phone, Fax, Email, WWW, CountryID, StateID, Company, Address1, Address2, City, Zip, Comments.
Sort Order	Enter a numeric value to indicate the display order of this Address Type entry. The sort order is used to sort the entries from lowest to highest numerical order when the Address Types are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Address Type entry.

SMTP

The Emerald Management Suite has a built in SMTP client used to automatically send invoices and statements, as well as mail other information, to your customers. In order for the mail client to work correctly, it needs to be fully configured before billing. The General menu SMTP option provides for the configuration of the SMTP client. The Emerald Administrator is only able to customize the information within the Emerald-provided Global SMTP options; the options cannot be deleted, nor added to.

Choosing the **SMTP** Global Administrative option will present the display of the current SMTP configuration. The Global SMTP options are described below. Note: When defining an SMTP server its important to make sure the SMTP server is configured to allow relay mail from the IP Address of the computer Emerald is installed or provide credentials for SMTP authentication so that outgoing email can be relayed to external domains.

Note: Once SMTP is configured the Email field in the billing groups menu should be checked to make sure it is valid. SMTP client features within Emerald 5 do not support SSL encryption of SMTP transactions.

Email Smart Host	Enter the email SMTP server hostname.
Email Login	For SMTP authentication this is the login name sent to the SMTP server. Note: CRAM-MD5 and LOGIN auth methods are supported.
Email Password	For SMTP authentication this is the password sent to the SMTP server.
Email Domain	Enter the full email domain name.
Email Admin	Enter the full email address, whereas the value will show in the From: line of all non-accounting related (such as incidents) mailings sent to users.
Email Accounts	Enter the full email address, whereas the value will show in the From: line of all accounting related (invoices and statements) mailings sent to users if billing group specific information is unavailable.
Email Retries	Maximum number of retries for temporary failures before no further delivery attempts is made.

Press the **Update** button to save any new or modified SMTP option value changes.

FTP

The FTP Global option provides for the setup of default configurations applied toward FTP user accounts established for your users. This is for use when you are using a directly supported FTP server (like Serv-U 6). The Emerald Administrator is only able to customize the information within the Emerald-provided Global FTP configuration options; the options cannot be deleted, nor added to.

Choosing the **FTP** Global Administrative option will present the display of the current FTP user attribute configuration. Retrieve an existing attribute value for view and/or edit by clicking on the desired entry. The Global FTP options are described below. When the Description value is clicked within the FTP Configuration display window, an entry box prompting for the new Value entry for the option will be presented for each of the following configuration fields. The FTP Configuration options are described below.

FTP Allow Directories	If selected to do so, this option will restrict the users ability to create subdirectories under their FTP user directory. If you select the 'No Sub-Directories' option, users will not be allowed to create their own directories.
FTP Max Directory Size	To restrict users to a maximum FTP directory size, enter the maximum size value.
FTP Default DIR UNC	Specify the base FTP directory for your FTP users by providing the directory path. If specified, Emerald will create this directory for your users upon account creation. Typically this is a directory in UNC format \\server\users. Emerald will append a \username by default to this directory when it is created.

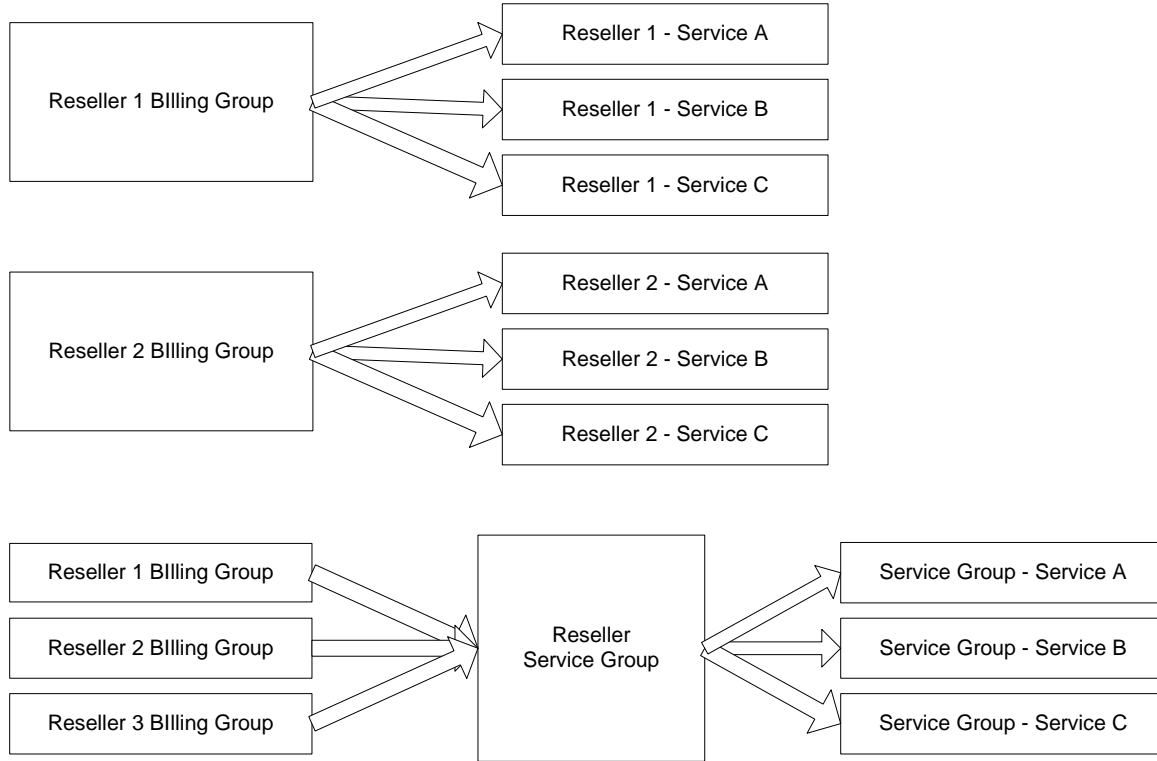Press the **Update** button to save any new or modified FTP option value changes.

Service Groups

In situations such as supporting a large number

of resellers where many billing groups exist in the system service groups help reduce the configuration burden by allowing items such as service types, payment periods, charge types and others to be grouped together for assignment to multiple billing groups. Without this grouping these items would need to be created separately for each individual billing group.

For example let's assume Reseller 1 and Reseller 2 are each assigned a similar set of service types. Service Types A, B and C. To support each reseller this scenario requires a total of 6 service types (2 resellers * 3 service types) be created.

```
┌──────────────────────┐          ┌────────────────────────────┐
│                      │ ───────▶ │   Reseller 1 - Service A    │
│                      │          └────────────────────────────┘
│ Reseller 1 BIlling   │ ───────▶ ┌────────────────────────────┐
│       Group          │          │   Reseller 1 - Service B    │
│                      │          └────────────────────────────┘
│                      │ ───────▶ ┌────────────────────────────┐
└──────────────────────┘          │   Reseller 1 - Service C    │
                                  └────────────────────────────┘

┌──────────────────────┐          ┌────────────────────────────┐
│                      │ ───────▶ │   Reseller 2 - Service A    │
│                      │          └────────────────────────────┘
│ Reseller 2 BIlling   │ ───────▶ ┌────────────────────────────┐
│       Group          │          │   Reseller 2 - Service B    │
│                      │          └────────────────────────────┘
│                      │ ───────▶ ┌────────────────────────────┐
└──────────────────────┘          │   Reseller 2 - Service C    │
                                  └────────────────────────────┘
```

```
┌──────────────────────┐        ┌──────────────┐        ┌────────────────────────────────┐
│ Reseller 1 BIlling   │ ─────▶ │              │ ─────▶ │  Service Group - Service A     │
│       Group          │        │              │        └────────────────────────────────┘
└──────────────────────┘        │              │        ┌────────────────────────────────┐
┌──────────────────────┐        │   Reseller   │ ─────▶ │  Service Group - Service B     │
│ Reseller 2 BIlling   │ ─────▶ │ Service Group│        └────────────────────────────────┘
│       Group          │        │              │        ┌────────────────────────────────┐
└──────────────────────┘        │              │ ─────▶ │  Service Group - Service C     │
┌──────────────────────┐        │              │        └────────────────────────────────┘
│ Reseller 3 BIlling   │ ─────▶ │              │
│       Group          │        └──────────────┘
└──────────────────────┘
```

With service groups all similar resellers billing groups are assigned to a service group reducing the number of service types needing to be configured from 6 for 2 billing groups or 9 for 3 billing groups to 3 regardless of the number of billing groups assigned.

Service Groups apply only in an additive fashion to the traditional assignment method where items such as service types are either assigned specifically to a billing group or available globally to all billing groups having global options enabled. Please see "Admin" / "General" / "Billing Groups" for additional information.

The use of service groups is optional and not recommended if the Emerald system contains a small number of billing groups

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or billing groups used generally for the purpose of restricting operator access.

Service Group	Text uniquely describing the service group. This text will appear in selection lists throughout the Emerald administrator when configuring one of the "Included" items below.
Description	Text describing the purpose and use of this service group
Service Types	When "Included" this service group is available for selection when configuring service types. See "Admin" / "Services" / "Service Types"
Discounts	When "Included" this service group is available for selection when configuring discounts. See "Admin" / "Accounting" / "Discounts"
Domains	When "Included" this service group is available for selection when configuring domains. See "Admin" / "General" / "Domains"
Package Types	When "Included" this service group is available for selection when configuring package types. See "Admin" / "Services" / "Package Types"
Billing Cycles	When "Included" this service group is available for selection when configuring billing cycles. See "Admin" / "Accounting" / "Billing Cycles"
Incident Types	When "Included" this service group is available for selection when configuring incident types. See "Admin" / "Incidents" / "Incident Types"
Regions	When "Included" this service group is available for selection when configuring regions. See "Admin" / "General" / "Regions"
Charge Types	When "Included" this service group is available for selection when configuring charge types. See "Admin" / "Accounting" / "Charge Types"
Sales Persons	When "Included" this service group is available for selection when configuring sales persons. See "Admin" / "Sales" / "Sales Persons"
Pay Periods	When "Included" this service group is available for selection when configuring pay periods. See "Admin" / "Accounting" / "Pay Periods"
Send Methods	When "Included" this service group is available for selection when configuring send methods. See "Admin" / "Accounting" / "Send Methods"
Sort Order	Used to order selection listing of service groups when selecting a service group and also when displaying the service groups admin menu.

Notices

The Emerald email notification system has a variety of uses including new customer welcome messages, incident status updates, account or credit card expiration warnings, payment receipts, account past due warning and more.

Notices			
Notice	**Notice Type**	**Active Matches**	**Options**
Expired service warning	Service expiration (Customers)	0	Test | Delete | Reset Actives | Schedule
5-20 day service expiration notice	Service expiration (Customers)	0	Test | Delete | Reset Actives | Schedule
Email Invoices	Email Invoices	N/A	
Email Statements	Email Statements	N/A	
Bulk Email	Support Email	N/A	

With requisite knowledge of the Emerald system additional types of notifications can be created using the "Admin" / "Advanced" / "Notice Types" menu. Note use of custom types configured through the "Notice Types" menu is beyond the scope of this document and standard IEA support offerings. Please contact your IEA Software representative about the possibility of implementing custom email notifications.

Email messages are sent out when the condition of a notice are met. Once this occurs emails are no longer sent until after the condition is no longer met and then reoccurs. As an example we'll use an expired account notice with an expired account having subsequently been paid up and then at some point in the future is expired again. At each point where the account is newly expired an email notification would be sent.

Notice Type	The type of notice to be sent. Available notice types appear in the selection list. Once selected a detailed explanation and use instruction is displayed below the notice description field in bold lettering.
Notice Description	Text uniquely describing the purpose of the email notification
Min/Max Days	Fields specific to a notice type. See description above in bold for additional information.
Mail From	From address of emails sent as a result of the criteria defined here. If Mail From is omitted the billing groups "Email From" field is used.
Mail Subject	Subject of the emails sent as a result of the criteria defined here. If Mail Subject is omitted the billing groups "Email Subject" field is used.
Mail CC	An additional email address to Carbon Copy when any emails matching this criterion are sent. If Mail CC is omitted additional copies are not sent.
Notice	Text of the message to be sent as a result of the criteria defined here. The notice description field shown in bold lettering usually contains a listing of "variables" available for replacement in the text of the message sent. Variables allow email messages to be customized for each recipient. Variables can contain items such as Name, Company and account details. An example of the use of variables can be found in the image above. "Hello $Name" is replaced with "Hello Peter" for customers named Peter.
Active	When active the notice is useable and emails are sent when the Emerald task scheduler executes this notice. When inactive emails are not sent.

After creating a notice choose the "Schedule" option from the options field of the notices listing to schedule the new notification to run at regular intervals.

The "Reset Actives" option should normally never be chosen. Selecting this causes all accounts currently matching this criterion and having already received a notice to be emailed a second time for the same purpose.

Sales

The sales menu provides for the configuration of Sales persons as well as related reporting and configuration of sales commissions.
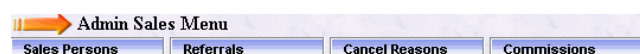
Sales Persons

Emerald also has the capability to track the sales person that sold and/or setup each new MBR account. The valid Sales Person list is configurable by the Emerald Administrator. Only the pre-configured selections will appear in the Sales Person pick list when creating or editing a MBR. Emerald Sales Persons entries are informational only and are used only for reporting.

Choosing the **Sales Persons** General Admin option will present the display of all existing Sales Person entries. Retrieve an existing Sales Person entry for view and/or edit by clicking on the desired entry. To remove a Sales Person entry, click the Delete link next on the selected entry. To add a new Emerald Sales Person, click the **New Sales Person** link.

The Sales Person entry fields are described below.

Sales Person	Enter a description of the Referral source. This description will be used within the Emerald "Sales Person" selection pick lists.
Operator	Provides for the association of Emerald Operators to sales persons for future reporting purposes.
Commission	A commission structure if any that should be applied to this sales person. When a commission is selected the commissions report will begin to provide sales commission data for the sales person. See "Commissions" for more information on configuring commissions.
Commission Multiplier	Serves as a point multiplier of points configured in the selected commission. If left blank a value of 1 is assumed as the commission's multiplier.
Billing Group	Billing Group this Sales Person is limited to or "Global" to allow all billing groups access to this sales person.
Service Group	In addition to Billing Groups, this sales person is also accessible to service groups that include "Sales Persons".
Sort Order	Enter a numeric value to indicate the display order of this Sales Person entry. The sort order is used to sort the entries from lowest to highest numerical order when the Sales Persons are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Sales Person entry.

Quick Tip:

The Emerald Sort Order fields can be used to *group*, as well as *sort* option entries. If a set of option entries has the same Sort Order value, they will be grouped together within the selection display. For example, if Sales has different locations, each location can have its own Sort Order number that can be assigned to the Sales Person entries to insure that Sales Persons are grouped by their location.

Referrals

Emerald allows MBR accounts to track the source that may have referred the user to your organization. Referral sources are configurable by the Emerald Administrator, allowing them to be tailored towards the particular informational needs of your organization. Only the pre-configured selections will appear in the Referred By pick list when creating or editing a MBR. Emerald Referrals are informational only and are used only for reporting.

Referrals			
Referral	**Group**	**Sort Order**	
Friend	Global	1	Delete
Family	Global	2	Delete
Advertising	Global	3	Delete
Website	Global	4	Delete
Other	Global	99	Delete

Choosing the **Referrals** General Administrative option will present the display of all existing Referral entries. Retrieve an existing Referral entry for view and/or edit by clicking on the desired entry. To remove a Referral entry, click the Delete link next on the selected entry. To add a new Emerald Referral source, click the **New Referral** link.

The Referral entry fields are described below.

Referral	Enter a description of the Referral source. This description will be used within the Emerald 'Referred By' selection pick lists.
Group	Billing group the referral is limited to. If group Global is chosen the referral is available to all billing groups.
String ID	Provides language support for referral selection in the Emerald UI and for reporting.
Sort Order	Enter a numeric value to indicate the display order of this Referral entry. The sort order is used to sort the entries from lowest to highest numerical order when the Referrals are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Referral entry.

Commissions

Emerald has the capability to use the combination of the MBR Sales Person information and configured commission information to support reporting on service types, package types and charge types. Commissions themselves, however, are only determined through the creation and use of the Sale Person Commission report and are not automatically generated and managed by the system. For example, the Sales Person Commission can

Commissions				
ID	**Commission**	**Type**	**Active**	
1	Peters commission group	Percentage	Yes	Delete
5	Secondary commission group	Points	Yes	Delete

be used to indicate and track commission percentages, or develop a commission point system, in which a custom report may be developed to calculate and track resulting commission data based on MBR invoicing activities.

Description	Text describing purpose and use of the commission.
Commission Type	Controls weather commissions are based on either a percentage of the amount invoiced or a set number of points for each item invoiced.
Active	When active the commission is visible to the commissions report
Sort Order	Used in ordering selection lists of commissions when managing sales persons

Once a commission is created service types, charge types and package types subject to commission are assigned to the new commission using the "New Item" link after selecting a commission for edit from the Commissions listing.

Commissionable Items

ID	Item Type	Item	Value	Comments	
1	Service	Netflow One	10 %	Peter testing	Delete
3	Package	Bussiness Web Hosting	3.50 %	test	Delete
4	Package	Family Dialup	10 %	test	Delete
5	Charge	DSL Setup	1 %		Delete
7	Service	t3	300.50 %	Lockness multiplier	Delete
8	Charge	DNS Registration	10 %	test	Delete
9	Charge	Reactivation Fee	10 %		Delete
10	Charge	Colocation Setup	10 %		Delete
11	Charge	PPP Setup	10 %		Delete
12	Charge	Rating engine charges	10 %		Delete
13	Charge	4 Hours wireless hotspot usage	10 %		Delete
14	Charge	10 hour hotspot access	10 %		Delete

Cancel Reasons

Emerald allows MBR accounts to be temporarily or permanently cancelled. During the cancellation process, the Emerald operator can indicate the reason for the account cancellation. The Cancel Reason options are configurable by the

Cancel Reasons

ID	Cancel Reason	Temporary	Customer Access	Sort Order	
1	Terminated - Bad account standing	No	No	1	Delete
2	Terminated - Late Payments	No	No	2	Delete
5	Temporary - ISP Request	Yes	No	5	Delete
3	Terminated - Customer Request	No	Yes	3	Delete
4	Temporary - Customer Request	Yes	Yes	4	Delete

Emerald Administrator, allowing them to be tailored towards the particular informational needs of your organization.

Choosing the **Cancel Reasons** General Administrative option will present the display of all existing Cancel Reason entries. Retrieve an existing Cancel Reason for view and/or edit by clicking on the desired entry. To remove a Cancel Reason, click the Delete link next on the selected entry. To add a new Emerald Cancel Reason, click the **New Cancel Reason** link. The Cancel Reason entry fields are described below.

Cancel Reason	Choose a descriptive cancellation reason. This description will be used within the Emerald 'Cancel Reasons' selection list when closing an MBR or Service.
Temporary	If the cancel reason is temporary and there is a reasonable chance the customer will return in the future Temporary should be set 'Yes'. This is used for reporting purposes only.
Customer Access	When Customer Access is enabled and the customer is allowed to cancel their services from the customer interface this cancel reason is made available for the customer to choose.
String ID	Provides language support for cancel reason selection in the Emerald UI and for

	reporting.
Sort Order	Enter a numeric value to indicate the display order of this Cancel Reason entry. The sort order is used to sort the entries from lowest to highest numerical order when the Cancel Reasons are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Cancel Reasons entry.

Accounting Configuration

The **Accounting** configuration option under the Emerald Administrative menu is where the most of the Master Billing Record and Service accounting related field selections are defined. The Accounting options work closely with the previously described General options by defining additional MBR and Service account selections. The Accounting options include the configuration of Charge Types, Rates, Taxes, Service Types, Billing Cycles, Discounts, Payment options and GL Codes, all of which are presented below.

Settings

Default Expire Grace Period (Days)	Sets the default permanent extension when creating a new service. Note that the default expire grace period is overridden by "Default Extension (Days)" setting of the billing cycle assigned to the MBR.
Setup Free Period Before Billing (Days)	On initial account creation the service is given this number of days free without charge. This is done by advancing the billed thru date of the service the number of days specified here.
Setup Expire Grace Period (Days)	Sets the temporary extension field in the MBR to allow an initial one-time grace period on initial account creation. After the MBR is invoiced the temporary extension value is removed from the MBR.
Inactivate MBR w/non-zero Balance	When set "Yes" allows canceled MBRs to be inactivated regardless of the accounts remaining balance. When set "No" the accounts balance must first be settled before a canceled account will automatically be marked inactive. Note for recurring billing cycle types "Inactive" accounts do not count against the licensed MBR count.
Renewal move expiration forward strategy	These options control how much of an invoice line item needs to be paid for recurring services before the expiration date is set to the accounts billed thru date. Note these settings apply only for renewal billing cycles. 'Amount is min amount paid' – When chosen the amount field below is the minimum amount that must be paid against a given invoice line item before the expiration date is advanced to the billed thru date regardless of the total cost of the line item. 'Amount is min percent paid' – When chosen the amount field below is the minimum percentage of the invoice line item that must be paid before the expiration date is advanced to the billed thru date.

	'Proportional to payment' – When chosen then expiration date is advanced proportional to the percentage of the invoice line item that has been paid. For example assuming 50% of a monthly recurring account has been paid the expiration advances 15 of the 30 days in a given month. 'Full payment required' – When chosen the invoice line item must be paid in full before the accounts expiration date is advanced to match the billed thru date.
Renewal move expiration forward amount	This field is used with the 'Renewal move expiration forward strategy' option above. This field is required when using the 'Amount is min amount paid' or 'Amount is min percent paid' options. The field is not used when 'Proportional to payment' or 'Full payment required' is chosen.
Interim Look-Ahead (Days):	This feature is designed to prevent frequent invoicing of accounts with long duration pay periods. When an adjustment or charge is made against an account and the MBR is not due to be invoiced again for recurring services within the "Interim Look-Ahead" days an interim invoice can be created at that point. If an invoice for recurring services is scheduled on or before "Interim Look-Ahead" days the creation of the interim invoice is delayed so that the interim charges or adjustments are made to appear on the same invoice as the recurring charges.
Invoice Next Term Max Days	Operators have the ability to manually force the invoicing of accounts into the future beyond "invoice bill days" defined at the billing cycle level. This option places a limit on how far services can be billed thru into the future while still allowing operators to manually force invoice creation for the accounts next term.
Print 0 Balance or Credit Statements	When "Yes" statements with an Ending balance of 0 will be included in batch printing for mailing to the customer.
Print 0 Balance or Credit Invoices	When "Yes" invoices with an MBR balance of 0 will be included in batch printing for mailing to the customer.
Send Receipts	When "Yes" payment receipts for new payments are automatically emailed to the customer. When "No" the customer can obtain receipts from the Customer interface or an Operator can manually send a payment receipt. Customer can disable receipt of payment receipts by disabling Account status notifications from the customer interface.
Send Manual Payment Receipts	When enabled receipts are sent for payments made manually by Emerald operators. When disabled receipts are only sent for automatic CC or EFT transactions.
CC/EFT Dupe payment protection (Days)	This is a safeguard that prevents CC or EFT transactions of the same amount from being processed within the number of days configured here. If a duplicate transaction is detected when adding a payment the operator is prompted and asked if they would like to continue anyway. If the duplicate payment is an automatic transaction it is marked as waiting to be confirmed. These transactions can be confirmed or voided from the Batch / Failed Transactions menu.
MBR Expired Automatic Close Reason	When automatically closing an MBR with a renewal billing cycle this specifies the cancellation reason associated with the automatic closure.
MBR Expired Automatic Close After	Period of time after which all services within an MBR with a renewal billing cycle have expired to automatically close the account. Note the scheduler task 'Expired MBR Auto Close' must be enabled. See Scheduler / Configure schedule.
Time and Data Left tracking	This option controls how time and data left usage limits are consumed and tracked. This option can be changed without affecting the time/data currently allocated to existing accounts.

	Simple – The time and data left fields in the service are incremented when additional time is added via one-time charges or direct use prepaid cards. This allocation never expires although the account itself may expire based on expiration date. For recurring accounts with 'time/data left monthly update' enabled additional time is only added by the monthly time/data left replenishment process if the current value of time/data left is less than the monthly allocation. If an invoice containing a one time usage line item that has incremented time left or data left in the service. Voiding that invoice does not change the allocated time or data remaining. **Detailed** – When enabled time and data purchased via one time charges or direct use prepaid cards are tracked separately outside of the time left and data left fields displayed when editing a service. While the service time/data left fields are not affected by one-time/direct use time/data purchases their value in the service field must not be blank if any such limits are to be enforced. If expiration Month/Day/Minutes are set via the one time charges menu the purchased time expires after the combined months/day/minutes limit has passed. Similarly for direct use prepaid cards the active expire days field controls the length of time the prepaid time/data is available for consumption. For recurring accounts with 'time/data left monthly update' enabled the monthly time and data allowances are reset in the time left field at the start of the customers new monthly period. Any additional purchased time/data is used only after the monthly allowances are consumed in reverse chronological order. For example customer 'neila' has a recurring account providing 1000 minutes of access per month. A few days before the start of his next month he runs out of time and purchases 5000 additional minutes. He uses 200 of them before the next month starts. The remaining 4800 minutes purchased are available in subsequent months and consumed only after that month 1000 minutes are exhausted. If an invoice containing purchased time is voided the associated allocation of time/data usage is also removed.
Time and Data Left monthly update	**Yes** – This updates the remaining time and data in a services time left and data left fields once a month provided a default time or data left is configured for the accounts service type and the services time or data left field is not blank or greater than its current value. **No** – Automatic monthly updating of the time and data left fields are disabled.
Minimum new statement interval (Days)	This controls the minimum allowed interval between automated new statement creations. It prevents too many statements from being created for an account based on activity in a given period. Statements can manually be created for an MBR if necessary.
Allow Setup Charge for new Accounts	When "Yes" any applicable setup charge is available to be applied when opening a new account. When "No" no setup charge is applied for new accounts.
Allow Setup Charge for Re-Opened Accounts	When "Yes" any applicable setup charge is available to be applied when re-opening a preexisting account. When "No" no setup charge is applied for re-opened accounts.
Allow Only Acct Admins to Override Setup Charge	When "Yes" only Operators of operator groups having the MBR Acct Admin object group assigned or global administrators may override the default setup charge settings. When "No" any operator may override the default setting.

Allow 'Custom' Charge Type for Adjustments	When "Yes" the custom charge type is selectable to operators when creating a new adjustment or POS invoice. When "No" the custom charge type is not selectable. Enabling this option may be useful to prevent operators from applying custom charges or credits to accounts that are not categorized into proper GL Categories for accounting purposes.
Enforce Chronological Invoice Void	When yes the billing system requires that any voided invoice containing recurring line item be voided in chronological order from newest to oldest so that proper adjustments can be made to the billed thru dates of effected services. It is highly recommended this be enabled. If it becomes necessary to disable this feature to address a specific account we recommend re-enabling this as soon as possible after making changes to the account.
New MBR Default Credit Limit	Default amount to set in the credit limit field while creating a new MBR with a balance forward billing cycle type.
Rating Charge Delay (Days)	Number of days after the rating summaries monthly period has elapsed before creating a charge for usage based on the summary. The delay is intended to provide some additional time for accounting data from the previous month to close out the month's usage in a single charge. If additional accounting data for a previous monthly period arrives after the delay period the system will generate an additional charge to account for any late arriving accounting data.
Rating Allow Interim Charges	When "Yes" charges will be created against any currently rated data regardless of whether the monthly period covered by the rated data has passed each time usage charges are processed. A setting of "Yes" is not recommended as it may cause many usage charge line items to appear on a single invoice or multiple invoices to be created when they would not otherwise. This is useful only if you need to invoice customers for their data usage on smaller intervals without having to wait for their monthly period to end. When "No" charges for rated data are only created after the period covered and the Rating Charge Delay above has passed. "No" is the default and recommended setting.

Accounting configuration	
Global Group	[Global Settings]
Default Expire Grace Period (Days):	15
Setup Free Period Before Billing (Days):	0
Setup Expire Grace Period (Days):	20
Inactivate MBR w/non-zero Balance:	No
Renewal move expiration forward strategy:	Amount is min amount paid
Renewal move expiration forward amount:	0.01
Interim Look-Ahead (Days):	45
Invoice Next Term Max Days:	120
Print 0 Balance or Credit Statements:	Yes
Print 0 Balance or Credit Invoices:	No
Send Receipts:	Yes
Send Manual Payment Receipts:	No
CC/EFT Dupe payment protection (Days):	14
Time and Data Left tracking:	Simple (Flat)
Time and Data Left monthly update:	Yes
Minimum new statement interval (Days):	1
Allow Setup Charge for new Accounts:	Yes
Allow Setup Charge for Re-Opened Accounts:	No
Allow Only Acct Admins to Override Setup Charge:	Yes
New MBR Default Credit Limit:	0
Rating Charge Delay (Days):	2
Rating Allow Interim Charges:	No (Recommended)

Update

GL Codes

GL codes are a way of tracking billing information in Emerald to your General Ledger in your Accounting system. Many items in Emerald can be tagged a GL Code,

GL Codes			
GL Code	**Description**	**Detail Flag**	
products	Products		Delete
taxes	taxes		Delete

GL Code				
GL Code:	products			
Description:	Products			
Detail Flag:				
	Update			

such as service types, taxes, charge types and package types. When you create reports or exports for GL purposes, grouping them by GL Code allows for easy summary and identification between the two systems.

GL Code	An identifier for the GL Code. This will be sent to the accounting system with each export entry.
Description	Enter an identifying description for the GL Code. This is only used within Emerald.
Detail Flag	Flag used in the GL report to determine whether to include all details of the GL Code or just one summary entry.

Batch Processors

Credit Card and EFT processing is handled through the configuration of batch processors. The configuration of a batch processor determines both interface used to communicate with an external batch transaction system and

CC/EFT Batch Processors									
Name	**Type**	**Processor Type**	**Organization**	**Billing Group**	**Rebatch Tries**	**Rebatch Interval**	**Card Types**	**Batch In**	**Batch Out**
Paymentech Orbital	Credit Card - Realtime	Paymentech Orbital	IEA Software, Inc	group 3			• MasterCard • VISA • American Express			Delete
Authorize.Net			IEA Software, Inc	All	0	1	• MasterCard • VISA • American Express • Diners Club • Discover			Delete

Edit Batch Processor		
Organization	IEA Software, Inc	Billing Group All
Processor Name	Peters auth.net account	
Processor Type	Credit Card - Realtime - Authorize.Net	
Allowed Card Types	☑ MasterCard ☑ VISA ☑ American Express ☑ Diners Club ☐ Carte Blanche ☑ Discover ☐ enRoute ☐ JCB ☐ Any	
Processor URL	http://endeavour/cgi-bin/transact.pl	
Login		Password
Rebatch Tries	0	Rebatch Interval (Days) 1
Active	Yes	
	Update	

also internal criteria used in the selection of an appropriate batch processor such Organization, Billing Group, batch type (CC or EFT) and credit card type (For example Visa or Amex).

Organization	Organization the batch processor is to be used with. Each organization that will be processing credit card transactions must have its own batch processor defined.
Billing Group	Optional billing group to further restrict the use of this batch processor. Note the "All" billing group means only those billing groups assigned to the selected Organization.

Processor Name	Text describing the purpose and use of this batch processor. Processor name appears in the "Credit Card" and "Bank Trans" options of the "Client" / "Billing" menu.
Processor Type	Specifies the type of the transaction system to integrate with. Processor Types are configured from the "Admin" / "Advanced" / "Exports" menu. The configuration of processor types is beyond the scope of this document and our normal support offerings. Please contact your sales representative about the possibility of supporting additional processors not found in this selection list.
Allowed Card Types	When used with a credit card "processor type" the allowed card types menu allows you to define all credit card types you wish to accept. For example if you accept Visa and MasterCard but do not accept Amex or a different processor handles Amex you would check "MasterCard" and "Visa" leaving Amex unchecked. The "Any" option allows all types of credit cards to be accepted by this batch processor including card types not explicitly listed.
Processor URL	When used with a network based "Processor Type" the processor URL is generally an HTTPS URL of the provider's transaction web service. For non-web service oriented "Processor Types" the Processor URL reflects the network address of the processing system in the form "IPAddress:Port". When a processor type is selected the most common processor address will automatically be entered into the Processor URL field. It is recommended this default not be changed unless you have been specifically requested to. Also it's very important to ensure you the secure "HTTPS://" URLs rather than "HTTP://" which provide no data encryption.
Login (Varies)	When a network based "Processor Type" is selected the login field represents the access account name or ID used to identify your organization to the transaction processing service.
Password (Varies)	When a network based "Processor Type" is selected the password field represents the access password or secret key (Transaction key) used to authenticate the identity provided above to the transaction processing service.
Batch Out File	When a file based "Processor Type" is select the batch out file represents the file(s) all credit card transactions Exported from Emerald are written to. The batch out file is generated locally from the perspective of the system running the Emerald task scheduler.
Batch In File	When a file based "Processor Type" is select the batch in file represents the result file(s) generated by the transaction processing software. The batch in file is read locally from the perspective of the system running the Emerald task scheduler.
Export Options	When a file based "Processor Type" is selected this Indicates what the system should do with the export batch file(s) if they already exist before performing an additional export.
Import Options	When a file based "Processor Type" is selected this Indicates what the system should do with the import batch file after it has been successfully processed.
Batch Limit	When a file based "Processor Type" is selected batch limit provides a limit on the number of transactions that can be exported at any one time to the export file.
Rebatch Tries	Enter the number of times that some types of failed transactions can be automatically retried. Only transactions created automatically via MBR payment types of "Credit Card" or "Bank Transfer" can automatically be retried. Manually submitted transactions which fail must be manually re-submitted.
Rebatch Interval (Days)	Enter the number of days to wait between each "Rebatch Try" configured above.
Active	When a batch processor is Active transactions are assignable to it. When a batch processor is Inactive **new** transactions are no longer assignable to that batch processor however any existing assigned transactions will continue to be processed normally regardless of the "Active" status.
Merchant ID (Varies)	Option visible only when the "Processor Type" requires or can accept an optional Merchant ID provided by your transaction processing company.
Store (Varies)	Option visible only when the "Processor Type" requires or can accept an optional

	Store provided by your transaction processing company.
Terminal (Varies)	Option visible only when the "Processor Type" requires or can accept an optional Terminal provided by your transaction processing company.

Late Fees

Emerald late fees provide the ability to issue monetary penalties for customers who have had an outstanding balance for an extended period of time. These fees are assessed based on a monthly percentage of the configured aging bucket(s) during statement creation. Late fees are only assessed in monthly intervals when a new statement is created regardless of the number of statements created within any given month. A textual example of a typical Emerald late fee is "You will be charged a monthly 2.5% late fee on any balances remaining after 90 days". NOTE: Late fees are added as normal charges against the MBR therefore late fees can and will be assessed upon previously unpaid late fees.

Late Fee	Text describing the purpose and configuration of the late fee.
Charge Type	Charge type used in assessing the late payment fee. The line item description of the late fees on the customers invoice is based on the description of the charge type rather than the description of the Late Fee itself. Any taxes applied to the charge type also apply to the late fee.
Monthly Percentage	The monthly late fee percentage to charge based on the portion of the aged balance on or over "Min Aged Date"
Min Aged Days	The minimum amount of days (Aging buckets) previous line items on invoices must remain unpaid before the unpaid amounts are counted as a late payment.
Min Amount	The minimum possible amount of the late fee to be charged if there is any outstanding balance on aging buckets on or above "Min Aged Days".
Max Amount	The maximum possible amount of the late fee to be charged.
Sort Order	Used to order the display of late fees in the "Late Fees" Accounting menu.

Charge Types

Emerald Charge Types are used to define the types of non-recurring charges that can be manually applied to an MBR (as account adjustments), or configured as a setup charge on an Emerald Service Type. These charges are typically one-time fees for a service (such as system setup or support calls), hardware purchases, or other miscellaneous account charges/credits. Charge Types defined here will be

Charge Types					
Description	**Amount**	**Tax**	**Group**	**GL**	
DNS Registration	3.12	None	Global	products	Delete
Reactivation Fee	10	None	Global	products	Delete
PPP Setup	20	None	Global	products	Delete
DSL Setup	20	DSL	Global	products	Delete
Colocation Setup	20	WA State Retail	Global	products	Delete
Rating engine charges	0	None	Global	None	Delete
4 Hours wireless hotspot usage	3.50	None	Global	None	Delete
10 hour hotspot access	30.50	None	Global	None	Delete
Dialup Usage	3.50	WA State Retail	Global	products	Delete

available to the Emerald Operator to describe and provide charge amount defaults when performing account adjustments.

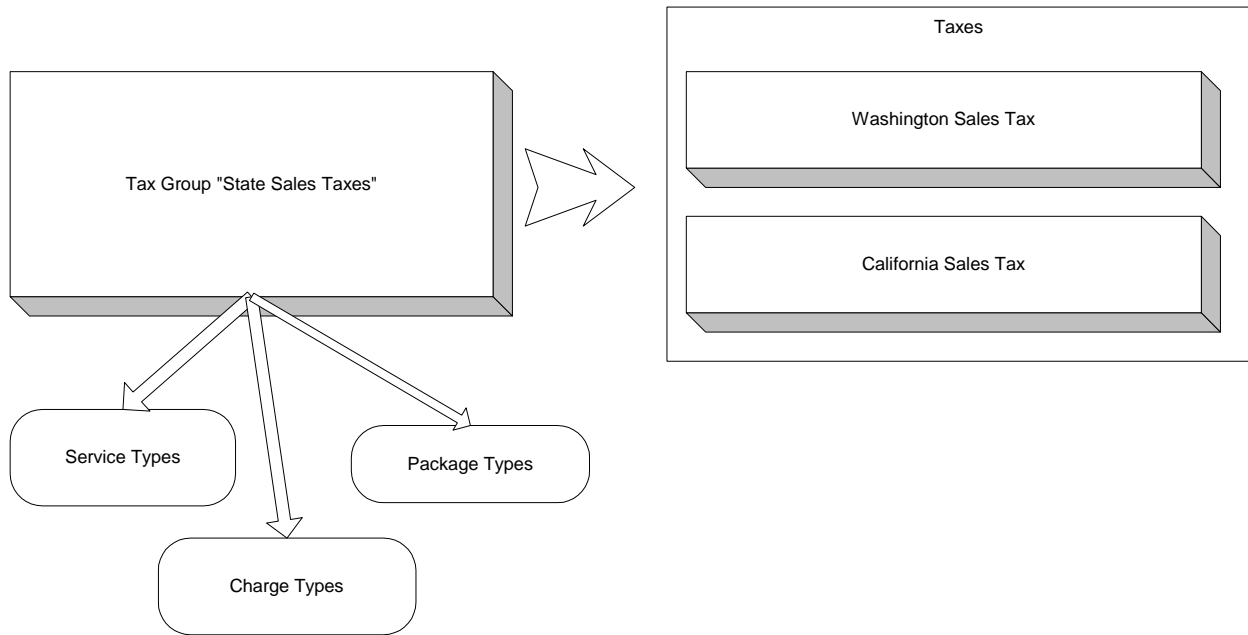| Charge Type	
Description:	DNS Registration
Amount: 3.12	String ID:
Billing Group: Global	Service Group: None
Tax Group: None	GL Code: Products
Tax Exempt:	☐ State Sales Tax ☐ Federal excise tax
Sort Order: 5	*(Neg. to exclude)*
	Update

Choosing the **Charge Types** Accounting Administrative option will present the display of all existing Charge Types. Retrieve an existing Charge Type entry for view and/or edit by clicking on the desired entry. To remove a Charge Type, click the Delete link next on the selected entry. To add a new Charge Type, click the **New Charge Type** link. The Charge Type entry fields are described below.

Description	Enter an identifying description for the Charge Type. This entry will be presented within the 'Charge Type' selection lists throughout Emerald.
Amount	Enter the default charge amount for this charge type. The Amount can be a credit or a debit entry. This default can be over-ridden within the Adjustment entry screen.
String ID	Provides language support for charge type selection in the Emerald UI and for reporting.
Tax Group	Choose the default Tax Group for this Charge Type. Defining a Tax Group indicates the Tax Group that should normally be applied to this type of account charge. The Tax Group default can be over-ridden on the account adjustment screen.
Tax Exempt	This provides for exclusion of individual Taxes from the chosen tax group that "subscribe" to any of the same exemptions selected here.
Billing Group	If the Charge Type is only to be available to MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'Global' Billing Group default is accepted, the Charge Type will be available to all Emerald MBRs.
Service Group	In addition to Billing Groups, this charge type is also accessible to service groups that include "Charge Types".
Sort Order	Enter a numeric value to indicate the display order of this Charge Type entry. The sort order is used to sort the entries from lowest to highest numerical order when the Charge Types are presented in selection pick lists throughout Emerald. A negative value hides this charge type from the Emerald UI allowing it to be used exclusively for system purposes such as rating or send method charges.
GL Code	GL Code for this entry.

Press the **Update** button to save the new or modified Charge Type entry.

Taxes

Emerald Tax Groups are used to define the rate and structure of the taxes that can be applied to Emerald MBR and Service accounts during the billing process. Once a Tax Group has been defined, it can be assigned to any number of Emerald Service and charge Types. Taxes are applied during invoice generation, according to the Tax assigned to the Service Type, as well as the defined regional taxation rules and the MBR and Service Types tax exemption status.

Tax Groups provide a grouping of taxes that can then apply to service, package and charge types. The membership of Taxes within a Tax Group can be made conditional based on Country, State, City, Postal Code and Region. Also tax exemptions at the MBR and service type levels allow further control to exclude taxes from a tax group in special situations.

Emerald supports many types of tax structures, including those with single, double and piggybacked tax calculations, tax floors, tax ceilings and tax limits. Emerald fully supports the complex Internet tax laws that are currently being implemented throughout the United States, such as what has been established in the state of Texas.

Choosing the **Taxes** Accounting Administrative option will present the display of all existing Tax definitions. Retrieve an existing Tax entry for view and/or edit by clicking on the desired entry. To remove a Tax, click the Delete link next on the selected entry. To add a new Tax, click the **New Tax** link. The Tax entry fields are described below.

String ID	Provides language support for invoice creation and reporting.
Cumulative	This option indicates whether the tax is to be applied individually to each charge item, or applied to the cumulative total charges for the MBR over the billing period. Choose 'Cumulative' if the tax is to be applied over the accumulated MBR billing period charges. Choose 'Non Cumulative' if the tax is to be applied individually per taxable item. Note: This selection will affect the application of Tax Limits, as an accumulative tax will apply the tax limits to the cumulative MBR charge totals and not individually per account charge. For example, if an Accumulative tax with a tax Floor of $15.00 is applied to an MBR with 2 services charged at $10/each, Emerald will apply no tax to the first $10.00 service and only apply tax to the last $5.00 of the second tax ($20.00 MBR total, less the $15.00 floor). A non-accumulative tax with a $15.00 floor would not apply any tax to the above services, as the $10.00 charge falls below the $15.00 Floor in both cases. The 'Non Cumulative Monthly' options apply ceiling and floor calculations on a monthly basis for recurring accounts regardless of the payment period of the services. For example using the 'Cumulative Monthly' setting with an account billed once on a yearly basis breaks up all service costs on a monthly basis, applying ceiling and floor constraints at a monthly rather than yearly level. For most simple taxes the cumulative option should be set to its default of 'Non Cumulative'. When Price Inclusive is selected the cost of the line item being taxed is decremented from the taxable amount of that line item. For example a 10% tax on a 100.00 (tax inclusive) line item generates a tax line item of 9.09 changing the line items original price from 100.00 to 90.91.
Tax Type	Provide grouping of similar taxes within a tax group in a way that only one tax within the tax group of the same tax type is applied to a given account. Recall that typically within a tax group all taxes matching the groups criteria (location, region, exemptions..etc.) apply to each taxable item. With tax groups only one tax having the same 'tax type' within a 'tax group' is applied. The decision of which tax to apply is based on the tax with the most specific location matching the MBR. For example a tax having Country, State and City defined matching the MBR is more specific than a tax where only a Country and State have been defined and match. 'Tax Types' are primarily intended to allow for variations of the same tax within a geographic area. If no 'tax type' is selected all taxes matching the location and region criteria of the 'tax group' are applied for all taxes in the 'tax group' having no 'tax type'. 'Tax Types' are configured via the 'Tax Types' menu option located in the Emerald Admin / Accounting menu.
Amount	Enter the tax rate in its direct numeric form. For example, an 8.1% tax rate is entered '8.1'.
Amount Type	The type of the amount stored in the amount field. When 'Percentage' the Amount field is a tax percentage of taxable items. When 'Static Amount' the amount field is a static taxable amount regardless of the cost of the taxable item.
Description	Enter an identifying description for the Tax. This value will be presented when configuring Tax Groups.
Piggyback Group	Piggyback groups provide for "Tax on Tax" configurations. Within a tax group taxes that have a piggy back group set use the "Piggyback Order" field to control the order multiple taxes are applied in.
Piggyback Order	Sets the "tax on tax" order within a piggyback group. Subsequently ordered taxes include taxable amounts of the taxes below them.
Subscribed	When a tax subscribes to an exemption that tax will not be charged if the MBR and or service type has

Exemptions	the subscribed exemption enabled.
Floor Limit	A Tax Floor defines what amount the item cost must reach before it is taxed. With a Floor Limit, tax will only be imposed if the item total reaches the Floor value. Tax will only be imposed on the item cost, less the Floor Limit amount.
Ceiling Limit	A Tax Ceiling defines what amount the item tax amount must reach before it can no longer be taxed. With a Ceiling Limit, tax will only be imposed up to the ceiling limit.
GL Code	GL Code for this tax.

Press the **Update** button to save the new or modified Tax entry.

Discounts

Emerald provides for the configuration of Discounts that can be applied directly to individual services upon creation, over all members of a particular Service Type, or those MBRs opting for a particular payment method (for example, pre-paying yearly). A typical example is providing an educational discount, in which there may be a 10% discount to educators and students.

Choosing the **Discounts** Accounting Administrative option will present the display of all existing Discount entries. Retrieve an existing Discount entry for view and/or edit by clicking on the desired entry. To remove a Discount option, click the Delete link next on the selected entry. To add a new Emerald Discount, click the **Discount** link.

The Discount entry fields are described below.

Name	Enter the identifying name for the Discount. This description will be used within the 'Discount' selection pick lists throughout Emerald.
Discount	Enter the amount of the discount. Enter the value in decimal form without currency or percentage symbols. For example, '5.00' for either a $5.00 or 5% discount.
String ID	Provides language support for discount selection in the Emerald UI and for reporting.
Static	This field indicates the type of Discount. Choose '**Static**' if the value is a flat discount amount, such as $5.00. Choose '**Percentage**' if the discount will be entered as a percentage of the cost to which it is applied, such as a 5% discount.
Billing Group	If the Discount option is only to be available to MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'Global' Billing Group default is accepted, the Discount will be available to all Emerald MBRs
Service Group	In addition to Billing Groups, this discount is also accessible to service groups that include "Discounts".
Sort Order	Enter a numeric value to indicate the display order of this Discount entry. The sort order is used to sort the entries from lowest to highest numerical order when the Discounts are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Discount entry.

Billing Cycles

Billing Cycles are a key component in the configuration of your account billing method. Billing Cycles are assigned to Master Billing Records primarily to specify the date in which billing will occur, typically relating the MBR to Monthly, Anniversary or Calendar related billing dates. MBR Billing Cycles are used in conjunction with Service Pay Periods to define both the date and length of an accounts billing period.

When a Billing Cycle is chosen for an MBR, the selection determines many of the primary billing characteristics of the account. Billing Cycles define not only the date alignment of the billing period (monthly, anniversary, calendar), but also whether the MBR account is Balance Forward or Renewal, the number of days in advance the account is billed (renewal notice sent) and possibly charged, if set up for

Billing Cycles

Description	Type	Billing Mode	Billing Day	Invoice Bill Days	EFT Bill Days	Group	
Anniversary	Anniversary	Renewal		20	5	Global	
Non-Recurring	Anniversary	Non Recurring		16	5	Global	
Calendar	Calendar	Balance Forward		20	5	Group t3	
Monthly	Monthly	Balance Forward		20	5	Group t3	Delete

automatic payment (configured for credit card or EFT). It is possible to define multiple custom billing cycles, however in general, the Emerald provided defaults of Monthly, Anniversary are sufficient.

Choosing the **Billing Cycles** Accounting Administrative option will present the display of all existing Billing Cycles. Retrieve an existing Billing Cycle entry for view and/or edit by clicking on the desired entry. To remove a Billing Cycle, click the Delete link next on the selected entry. To add a new Emerald Billing Cycle, click the **New Billing Cycle** link. The Billing Cycle entry fields are described below.

Description	Enter the identifying name for the Billing Cycle. This description will be used within the 'Billing Cycle' selection pick lists throughout Emerald.
String ID	Provides language support for Billing Cycle selection in the Emerald UI and for reporting.
Type	Select the type of Billing Cycle being created. The Billing Cycle type determines when the Emerald will perform the billing on the account. The options are described below: • **Monthly**: Sets the start of the billing cycle to "Billing Day" (If blank the 1st of the month). • **Anniversary**: Sets the start of the billing cycle to match the MBR Start Date, or anniversary, of the service. For example, if a service Start Date is the 18th of the month, the service will be billed on the 18th of the month for each subsequent billing period. • **Anniversary (Period Aligned)**: Similar to Anniversary except that Emerald will also attempt to pro-rate the service so that its billing date is aligned with other services in the MBR having the same pay period. • **Calendar**: Like the "Monthly" option, also sets the start of the billing period to "Billing Day" (If blank the 1st of the month) however, this option will additionally align the Pay Period of the service to a true calendar-based cycle. For example, Quarterly pay period billing will be aligned with standard calendar-based Quarters, instead of just billing at quarterly three month intervals beginning from the service account Start Date. **NOTE: Calendar billing requires the pay periods used be factors of 12** (1, 2,3,4,6 and 12 months). This is necessary to prevent multi-year drift of "months of year" billed. See the Emerald User's guide for more detailed information on MBR Billing Cycle and service Pay Period options and behavior.
Billing	Selects the billing rules that will be used for the MBR.

Mode	• **Renewal**: With this billing mode recurring services are billed automatically provided they have not expired or the "Allow renewal (days)" and "Allow renewal (periods)" have not been exceeded. Renewal billing uses the service expiration date field. • **Balance Forward**: This mode bills recurring services indefinitely regardless of the payment status of previous invoices. Balance forward billing uses the MBRs credit limit in lieu of a per service expiration date to prevent customers who have not paid for service from accessing their accounts. • **Non-Recurring**: This mode disables all automatic recurring billing for the MBR. When used the customer and or operator must explicitly purchase and fully pay for the service before it is granted. In this mode the expiration field is used to determine account expiration. Additionally MBR licenses are counted against an active MBR only when there are one or more services that have not yet expired. Non-recurring billing is useful for providing pre-paid "Pay-As-You-Go" services. See "Admin / Accounting / One Time Charges" for details on enabling pre-paid purchases.
Allow Renewal (Days)	In the Renewal billing mode this determines the number of days past account expiration to still allow a service to be invoiced again for its next billing cycle. By default expired accounts are not invoiced until the outstanding invoice has been paid. Also see Billing Mode / Renewal above.
Allow Renewal (Periods)	In the Renewal billing mode this determines the number of billing cycles (where time is a function of the accounts pay period) past account expiration to still allow a service to be invoiced again for its next billing cycle. By default expired accounts are not invoiced until the outstanding invoice has been paid. Also see Billing Mode / Renewal above.
Invoice Bill Days	Enter the number of days prior to the billing period due date (service account Expire Date) that an invoice should be distributed to the MBR.
EFT/CC Bill Days	Enter the number of days prior to the billing period due date (service account Expire Date) that the automatic payment transaction (credit card or EFT) for the MBR account should be processed, if configured to do so.
EFT/CC Auto Trans Days	Controls when billable amounts of unpaid invoices for EFT/CC auto pay customers are to be billed via EFT/CC based on count of days between current date and earliest starting date of the recurring line items of the invoice. This setting must be less than or equal to the EFT/CC Bill Days field. For example assume 'EFT/CC Bill Days' is 10 and 'EFT/CC Auto Trans Days' is 4. Next invoice is created 10 days before the start of that cycle. 6 Days later, (4 days before start of next cycle) the billable amount of the invoice can be automatically charged o the customers EFT/CC account. If the field is left blank (recommended setting) any non-POS invoices created are immediately eligible to be billed via EFT/CC. This field has no effect on invoices that do not have one or more recurring line items.
Sort Order	Enter a numeric value to indicate the display order of this Billing Cycle entry. The sort order is used to sort the entries from lowest to highest numerical order when the Billing Cycles are presented in selection pick lists throughout Emerald.
Billing Group	If the Billing Cycle is only to be available to MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'Global' Billing Group default is accepted, the Billing Cycle will be available to all Emerald MBRs.
Service Group	In addition to Billing Groups, this billing cycle is also accessible to service groups that include "Billing Cycles".
Billing Day	The day of the month that an account should be billed. When an account is created it will pro-rate to this day. Billing day does not apply when "Type" is "Anniversary".
Default extension (Days)	Determines a new service default permanent extension overriding Accounting / Settings / Default Expire Grace Period.

Press the **Update** button to save the new or modified Billing Cycle entry.

Pay Periods

Each MBR Service account is associated with a Pay Period that defines the frequency at which the billing for that particular Service occurs. Used in conjunction with the MBR Billing Cycle, the Pay Period determines the billing period of each MBR Service. Because Pay Periods are defined

Payment Periods						
Period	**Service Type**	**Period**	**Discount**	**Setup Charge**	**Group**	
Monthly	All	1 Month	0%	Yes	Global	Delete
Bi-Weekly	All	15 Day	0%	Yes	Global	Delete
Quarterly	All	3 Month	20%	Yes	Global	Delete
Six Months	All	6 Month	30%	Yes	Global	Delete
Yearly	All	12 Month	40%	Yes	Global	Delete
Weekly	All	7 Day	0%	Yes	Global	Delete

per Service and not MBR, Emerald provides the ability to create an MBR that may have one service billed at a flat rate quarterly, but have an additional service perhaps based on network usage that is billed monthly. Emerald Pay Periods define the number of months or days that the pay period spans, any automatic discounts that are applied to services with the Pay Period (for example, offering a 10% discount if the user pre-pays yearly), as well as any setup costs applicable to the pay period.

Choosing the **Pay Periods** Accounting Administrative option will present the display of all existing Pay Period options. Retrieve an existing Pay Period entry for view and/or edit by clicking on the desired entry. To remove a Pay Period option, click the Delete link next on the selected entry. To add a new Emerald Pay Period, click the **Pay Period** link. The Pay Period entry fields are described below.

Pay Period	Enter the identifying name for the Pay Period. This description will be used within the 'Pay Period' selection pick lists throughout Emerald.
String ID	Provides language support for pay period selection in the Emerald UI, invoicing and for reporting.
Service Type	If the Pay Period option is only to be available to Service accounts of a specific Service Type, select the appropriate type from the Service Type selection pick list. If the 'All' Service Type default is accepted, the Pay Period option will be available to all Emerald Services.
Period	Enter the number of months or days in the Pay Period.
Setup Charge	Option to indicate if the Setup Charge associated to the Service Type applies to MBR Service accounts using this Pay Period. Choose 'Yes' to apply the setup charge, 'No' if not. For example, Service Setup Charges do not apply to those billed Quarterly.
Discount	Enter the amount of the discount applicable to services using this Pay Period option. Enter the value in decimal form without currency or percentage symbols. For example, '5.00' for either a $5.00 or 5% discount. Select from the drop down the type of Discount entry. Choose '**Static**' if the value is a flat discount amount, such as $5.00. Choose '**Percentage**' if the discount will be entered as a percentage of the cost to which it is applied, such as a 5% discount. Leave blank or enter '0' if no Discount applies. The discount can be over-ridden individually per Service account.
Billing Group	If the Pay Period option is only to be available to MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'Global' Billing Group default is accepted, the Pay Period will be available to all Emerald MBRs
Service Group	In addition to Billing Groups, this pay period is also accessible to service groups that include "Pay Periods".
Sort Order	Enter a numeric value to indicate the display order of this Pay Period entry. The sort order is used to sort the entries from lowest to highest numerical order when the Pay Periods are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Pay Period entry.

Send Methods

Emerald Send Methods are configured to define the methods that account billings, such as invoices and statements, can be distributed. The Emerald Send Method default options include Postal Mail and email format options: Text, PDF (Requires crystal reports) and HTML.

ID	Description	Send Charge	Print	Email	Group	
0	Postal Mail	None	PDF	HTML	Global	Delete
1	Email Text	None	None	HTML	Global	Delete
2	Email HTML	None	None	HTML	Global	Delete
12	Email PDF	None	None	HTML	Global	Delete
3	None	None	None	HTML	Global	Delete

Choosing the **Send Methods** Accounting Administrative option will present the display of all existing Send Method options. Retrieve an existing Send Method entry for view and/or edit by clicking on the desired entry. The Send Methods entry fields are described below.

Description	Enter an identifying description of the Send Method. This description will be used within the 'Send Method' selection pick lists throughout Emerald.
String ID	Provides language support for send method selection in the Emerald UI.
Group	If the send method option is only to be available to MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'Global' Billing Group default is accepted, the send method will be available to all Emerald MBRs
Service Group	In addition to Billing Groups, this send method is also accessible to service groups that include "Send Methods".
Print Type	For send methods that print paper invoices and statements the print type determines the format printable documents are rendered to. NOTE: Some print types may not be available depending on the reporting engine used a suitable substitute may automatically be used.
Email Type	For email based send methods this determines the format of the email sent to the customer. NOTE: Some print types may not be available depending on the reporting engine used a suitable substitute may automatically be used.
Print CC/EFT Auto	When the customers pay method is CC or EFT this controls weather invoices and statements for this customer should also be printed.
Email CC/EFT Auto	When the customers pay method is CC or EFT this controls weather invoices and statements for this customer should also be emailed.
Send Method Charge	If a charge type is selected the default amount of the selected charge type is charged to the MBR after a bill has been successfully printed for postal mailing or emailed.
Customer Access	When 'Yes' send method is available for end users to select from the customer center. Access to the customer center menu to change send methods is controlled from the Emerald Admin / Web Interface / Customer Settings menu.
Sort Order	Enter a numeric value to indicate the display order of this Send Method entry. The sort order is used to sort the entries from lowest to highest numerical order when the Send Methods are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Send Method entry.

One Time Charges

One Time Charges allow customers to pre-pay for a block of time or data they can use to access services. This feature is useful for hotspots and pre-paid card applications where customers may just purchase a few hours of time and never use their account

again. When a one-time charge is configured and the associated charge has been paid in full the services Time Left and or Data Left field is incremented by the amount of time purchased. NOTE: The time left field is only modified

when it contains a value. If the services time left field is blank no changes will be made should someone purchase a block of time.

Time charges work by associating charges with service types and defining a corresponding number of minutes.

If a one-time charge is configured a customer with remote access set to "Manager" can login to his or her account thru the Emerald customer interface and choose from a list of options based on options configured here.

Time Charge	A short name describing the plan, this name is viewable by the customer if customer access is allowed.
String ID	Provides language support for time charge selection in the Emerald UI, while invoicing and for reporting.
Charge Type	Defines the cost and any applicable tax of the block of time being purchased.
Service Type	Defines which service type is eligible to receive additional time.
Package Type	Defines which package type is eligible to receive additional time.
Months	* Number of months out account expiration is to be set after this one-time charge is paid in full.
Days	* Number of days out account expiration is to be set after this one-time charge is paid in full.
Minutes	* Number of minutes out account expiration is to be set after this one-time charge is paid in full.
	* Months, Days and Minutes fields are combined when determining account expiration. If the account is not expired the time purchased is added to the existing expiration date otherwise the time purchased is added to the current time.
Time Left	Online time in minutes to add to the accounts time bank when this one-time charge is paid in full. If the account does not have a time left restriction time left is not set. If the account is not expired and the existing time left value is a positive value then time left is added to the existing value. In all other cases time left is set to the time left value.
Bytes Left	Online data in bytes to add to the accounts data bank when this one-time charge is paid in full. If the account does not have a data left restriction data left is not set. If the account is not expired and the existing data left value is a positive value then bytes left is added to the existing value. In all other cases data left is set to the bytes left value.
Sort Order	Used to order available purchase options in the customer interface.
Description	A detailed description of the plan, may include HTML and hyper-links, this is visible by the customer if customer access is enabled and the customer purchased thru the Emerald customer center.
Customer Access	When set to allow customer purchase the customer may purchase the additional time from the customer web site. If this is not enabled time may only be purchased by an Emerald operator adding the charge configured 'Charge Type' as an adjustment or POS invoice. Note the "Admin" /

	"Web Interface" / "Customer Settings" / "Customer Website Allow Time Purchase" option must be enabled to allow the customer to make unattended purchases from the customer interface.

Payment Types

Payment Types have a dual role of defining the available payment methods available when configuring an MBR and the payment types selectable when applying payment to an account. Payment types cannot be added or modified. This is because they require special handling by emeralds billing engine. For example the credit card payment type is linked to the external transaction system, the pre-paid card type to the pre-paid card management system and so on. The payment types editor

Payment Types Editor

Payment Type	Description	StringID	Customer Description	Cust StringID	GL Code	Sort Order
Renewal	Renewal		Invoice / Manual Billing			1
Cash	Cash				None	10
Check	Check				None	20
Credit Card	Credit Card		Automatic Credit Card Bill		None	30
Bank Transfer	Bank Transfer				None	40
Pre-Paid Card	Pre-Paid Card				None	50
Other #1	Other #1				None	-1
Other #2	Other #2				None	-1

Update

gives you the ability to customize the labels of each type; set the order each payment type should appear and associate general ledger codes for reporting purposes.

The other #1 and other #2 types are user definable types equivalent in function to the "Cash" payment type. Uses for these are site specific however some examples may be the processing of payments through an external transaction system that does not directly integrate with Emerald. Each payment type is reported separately in payment reports and distinguishable in the MBRs payment history. If you wish to use the other #1 or other #2 payment types set the description field to reflect the use of the payment type and set the sort order to a positive value to make it visible from the MBR payments menu.

Payment Type	Internal description highlighting the use of the payment type.
Description	User definable description of the payment type. This description is viewable from both the MBR payment method selection list when editing an MBR and the payment type selection list when applying payment to an MBR.
StringID	Provides language support for payment type selection in the Emerald UI and for reporting.
Customer Description	User definable description available via the end-user customer account center
Cust StringID	Provides language support for customer center payment type selection in the Emerald UI.
GL Code	GL Code used for payment reporting
Sort Order	Controls order in which payment method and payment type listings are displayed throughout Emerald. If Sort Order is less than 0 the payment type is hidden from view.

Incidents

An incident is similar to a 'case' or 'ticket' in other systems. Incidents can be used to track problems, sales, the progress of projects and other situations as necessary. Emerald Operators and Customers through the customer account center have the ability to create and manage incidents. Features such as due dates, prioritization,

assignment, time tracking, escalations, email notification and custom data fields allow incidents to be useful in a wide range of situations.

Incident Types

Incident Types allow you to categorize the customer support incidents tracked within Emerald. This is especially useful for summarizing to help evaluate incident data.

Choosing the **Incident Types** option will present the display of all existing Incident Types. Retrieve an existing Incident Type entry for view and/or edit by clicking on the desired entry. To remove an Incident Type, click the Delete link next on the selected entry. To add a new Emerald Incident Type, click the **New Incident Type** link.

The Incident Type entry fields are described below.

Incident Type	Enter a short descriptive name for the Incident Type.
State Group	Provides a listing of possible incident states applicable to this incident type.
Description	Enter a longer comment or description to clarify the Incident Type.
Email	If a particular person should receive notice of activity regarding this type of Incident, enter the full email address of the person to be notified when this type of incident is created. If left blank, notification will be sent to the Administrator, as configured in the Emerald SMTP configuration.
Default Role	For new incidents added from the customer account center and optionally operator interface setting reflects default role incidents are assigned.

Default Applies To	When 'Customers Only' default role applies to incidents created by end users from the customer center only. When 'Customers and Operators' default role applies to new incidents generated by operators and end users.
Billing Group	Optional Billing group to restrict use of this incident type.
Service Group	In addition to Billing Groups, this service type is also accessible to service groups that include "Incident Types".
Show Priority	When enabled the priority selection list is displayed. Priority is used to set the relative importance of the incident.
Show Email	When enabled the Email field used for emailing copies of the incident is displayed.
Show Duration	When enabled the Time field is available when adding incidents and actions. The total time for the incident and all actions is also displayed. The time field is intended for time tracking purposes possibly to assist in the calculation of billable hours for services provided.
Show Due Date	When enabled the "Resolve By" date is displayed showing the date this incident should be marked as having been resolved by.
Show Customer Access	When enabled the Customer access check box is displayed for the incident and during the creation of new actions. Customer Access allows the customer access to view incidents and actions created by an operator.
Per Incident Due Dates	When enabled the Due Date field is available when adding a new incident. The Due Date field overrides the assumed due date which is based on the "Overdue Days" field below. When an Incident is overdue the escalation procedures for overdue incidents are followed (See "Operator Roles")
Show Summary	When enabled the Summary field is displayed above the Incident to provide a title or short description of an incident. The Summary field is not required and if not provided or not enabled the first several words from the incident will be used in lieu of the summary field.
Customer Access	When enabled customers adding new incidents from the customer account center are able to select this incident type. If Customer Access is not enabled only Emerald Operators may add incidents of this type.
Overdue Days	This field determines the "resolve by" date of an incident. When an open incident is assigned to a role and has been open longer than Overdue Days the overdue escalation procedure for that role is followed.
Escalate Days	Determines number of days an open incident assigned to a role is automatically escalated following the escalation procedure for that role.
Warn Days	When set a warning is sent to the owner of the incident after an incident has been open for the number of days specified.
Sort Order	Enter a numeric value to indicate the display order of this Incident Type entry. The sort order is used to sort the entries from lowest to highest numerical order when the Incident Types are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Incident Type entry.

In addition to the above field options additional custom fields can be made available with incidents by click the "New Custom Field" link for an Incident Type anytime after the creation of the new type.

Field Name	Label defining the purpose of the custom data field.
Data Type	The type of data being stored in the custom data field.
Customer Access	When set 'Yes' customers are able to enter information for this custom data field from the assistance menu of the customer account center.
Searchable	When set 'Yes' the contents of this custom data field are searchable from the Support /

	Incident Search menu.
Required	When set 'Yes' the operator entering a new incident is required to provide a value for this custom data field when creating or updating an incident
Validation RegExp	Regular expression the custom data field must satisfy before an incident can be created or updated. Regular expression syntax is based on JavaScript compatible regular expressions. The following are examples of regular expressions: At least three characters (ABCDEFG): \w{3} Exactly 5 numeric digits (12345): ^\d{5}$ Three word characters then three numeric digits (ABC123): ^\w{3}\d{3}$ MAC Address Format: ^[\da-f]{2}:[\da-f]{2}:[\da-f]{2}:[\da-f]{2}:[\da-f]{2}:[\da-f]{2}$ Ipv4 Address Format: ^\d{1,3}\.\d{1,3}\.\d{1,3}\.\d{1,3}$
SQL Query	SQL Query used to retrieve a listing of possible values for the custom data field. The query must return a single result set containing the columns 'Value' and 'Description'. Value contains the stored value or primary key of the selection and Description contains a textual description of the selection to the operator.
Sort Order	Relative order this field appears in relation to other custom data fields defined within this incident type.

Incident States

The Incident States option allows you to customize the status categories available for the tracking of Emerald Incident entries. This allows the ability to tailor the available states to meet the particular informational needs of your organization. Incident Status types are informational only and are used only for reporting and incident grouping.

Choosing the **Incident States** General Administrative option will present the display of all existing Incident States. Retrieve an existing Incident State entry for view and/or edit by clicking on the desired entry. To remove an Incident State, click the Delete link next on the selected entry. To add a new Emerald Incident State, click the **New Incident State** link. The Incident State entry fields are described below.

Incident States

State Group	State	Description	Open	Wait	Escalate	Block	Archive	Access
Default	Open	Open	Yes	No	No	No	No	Yes
Default	Assigned	Assigned	Yes	No	No	No	No	No
Default	Escalated	Escalated	Yes	No	Yes	No	No	Yes
Default	WIP	WIP	Yes	No	No	No	No	Yes
Default	Resolved	Resolved	No	No	No	No	No	Yes
Default	Closed	Closed	No	No	No	No	No	Yes
Default	Closed	Closed	No	No	No	No	No	Yes
Default	Closed	Closed	No	No	No	No	No	Yes
Default	Other	Other	Yes	No	No	No	No	Yes
DSL Install	Qualification	Waiting for Results of Qualification	Yes	No	No	Yes	No	Yes
DSL Install	Local Loop	Waiting for local loop install	Yes	No	No	Yes	No	Yes
DSL Install	Customer Install	Waiting for Customer Install	Yes	Yes	No	Yes	No	Yes
DSL Install	Working	Customer DSL Installed and working	No	No	No	No	No	Yes
DSL Install	Qualification Failed	Customer Failed Loop Qualification	No	No	No	No	No	Yes

Incident State	Enter a short descriptive name for the Incident State.

State Group	Sets the "State Group" this incident state are a part. State groups provide a grouping of Incident States which is assigned to Incident Types.
Description	Enter a longer comment or description to clarify the Incident State.
Status Open	When enabled the Incident is considered Open and unresolved
Status Escalated	When enabled the Incident is considered Escalated and the escalation rules for the Operator role the incident is assigned are followed.
Waiting for Customer	When enabled the Incident is dependent on additional information or feedback from the customer.
Archive or Knowledge Base	When enabled the Incident is eligible to be included in a customer knowledge. Currently unused by Emerald and provided for informational purposes only.
Status Blocking	When enabled the Incident is considered important enough to block an action from occurring. An example of this would be a bug that prevents the rollout of a customer website.
Customer Access	Reserved for future use
Availability	When set 'Incidents & Actions' this state is available to be applied at either the incident or incident action level. When 'Actions Only' the state can only be applied to incident actions. Within the client interface - incident states showing 'Actions Only' begin with the '*' character and will not automatically change the state of the underlying incident.
CSS Style	Sets the CSS style for the incidents in this state when viewing a listing of incidents or making a selection from the Status field. Setting a style can make a particular incident state stand out by changing its color or choosing a different font size or font style.
Sort Order	Enter a numeric value to indicate the display order of this Incident State entry. The sort order is used to sort the entries from lowest to highest numerical order when the Incident States are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Incident States entry.

State Groups

State groups bundle sets of "Incident States" so that the bundle of related "Incident States" can easily be applied to an "Incident Type". After a state group is created the new state group is available to be associated with "Incident Types" and "Incident States".

Operator Roles

Assignment of responsibility for an incident in Emerald is accomplished using Roles. A Role is the logical grouping of operators with similar responsibilities. For example all support staff may be assigned to the role of "Technical Support" and all accounting

staff assigned the "Accounting" role. Whenever a new incident is assigned to a role the routing configuration defined for each member is examined and the system automatically selects a member of the role that will take responsibility for processing of an incident until it is closed. Note that it is not possible to assign incidents to

individual operators. Instead a role can be created with the operators name and the operator assigned that role. We recommend in these cases instead a more abstract

role be created which speaks to the specific job function of the operator. This approach provides for more flexibility as your organization evolves.

Automatic assignment is dependent upon the assignment strategy of the role. Using the "Balanced" strategy when an incident is assigned the system examines each operator's current load of open incidents. The operator with the least number of open tickets with respect to the target and maximum open count configured for the operator is assigned the incident. Using the "Round-Robin" strategy incidents are evenly distributed to operators regardless of the number of open incidents they have. Round-Robin respects target and maximum open count configuration. Another factor for automatic assignment is tier groups. These groups are used for overflow assignment to a secondary set of operators who may be managers or work in other domains but have the requisite knowledge to resolve an incident. A good example of where tier groups are useful is holidays where incident volume may exceed the capacity of the primary tier to handle.

The "Balanced" strategy is designed to favor the end customer and assumes all operators are acting collaboratively in the best interests of

	Assigned Operators							
ID	Operator	Group	Target Open	Max Open	Tier	Escalate	Overdue	
2	peterd	All	20	100	1	Yes	Yes	Delete
3	admin	All	100	1000	1	Yes	Yes	Delete

the customer. It is relatively trivial for an operator to open and assign irrelevant incidents or keep resolved incidents open longer than necessary in a bid to reduce their total incident load over time. Therefore especially in larger organizations it is recommended managers review metrics such as the volume of answered requests on a per operator basis.

Edit Operator Role Settings

Operator: admin
Billing Group: All
Show Past Due: Yes
Show Escalated: Yes

Target Open Count: 5
Max Open Count: 10
Tier: 1

Update

Operator	Emerald operator to assign to this role.
Billing Group	When not set "All" this operator will only be assigned when the incident created is a member of the same billing group specified here.
Show Past Due	If "Yes" overdue incidents assigned to the role also appear in the operators open incidents list and an overdue escalation notice is sent to the operator.
Show Escalated	If "Yes" escalated incidents assigned to the role also appear in the operators open incidents list and an escalation notice is sent to the operator.
Target Open Count	Under ideal conditions this reflects the number of open incidents this operator is expected to handle at any one time. This field is used to calculate which operator in the role is the best candidate to be assigned an incident based on operators' current distribution of open incidents.
Max Open Count	Reflects the maximum number of open incidents this operator is allowed to have.
Tier	Tiers provide for ordering of assignments to operators within a role for overflow purposes. If the "Max Open Count" for all operators in the lowest tier has been reached incidents will begin to be assigned to the tier above the lower and so on until all tiers have been exhausted. If this happens the incident is assigned to the operator least over "Max Open Count" regardless of tier. Operators in higher tiers are generally managers and operators who have a different primary job function from the role.

Priorities

This menu provides the priority selection list available when adding or modifying an incident. It is also the source of priorities used for the rule ordering within the rating engine. (See "Rating"). The included priority levels should not be removed.

	Priorities			
Level	**Priority**	**String ID**		
0	Low		Delete	
10	Normal		Delete	
20	Above Normal		Delete	
30	High		Delete	
40	Very High		Delete	
50	Critical		Delete	

Priority Editor

Level [   ]
Priority [   ]
String ID [   ]

[Update]

Level	Numeric value describing the relative priority. Lower numbers reflect a lower priority while higher numbers indicate higher priority.
Priority	Description of the priority level such as "Low", "Normal" and "High".
String ID	Provides language support for priority selection in the Emerald UI and for reporting.

Rating

Within Emerald rating is the process of taking available

Admin Rating Menu

Rates	Rule Sets	Time Sets	Rate Classes	Intervals
Data Sources				

usage information such as network flows or call detail records (CDR) matching this data to an account (Classification) based on defined rules and available customer information to charge the account for usage and or enforce usage limits.
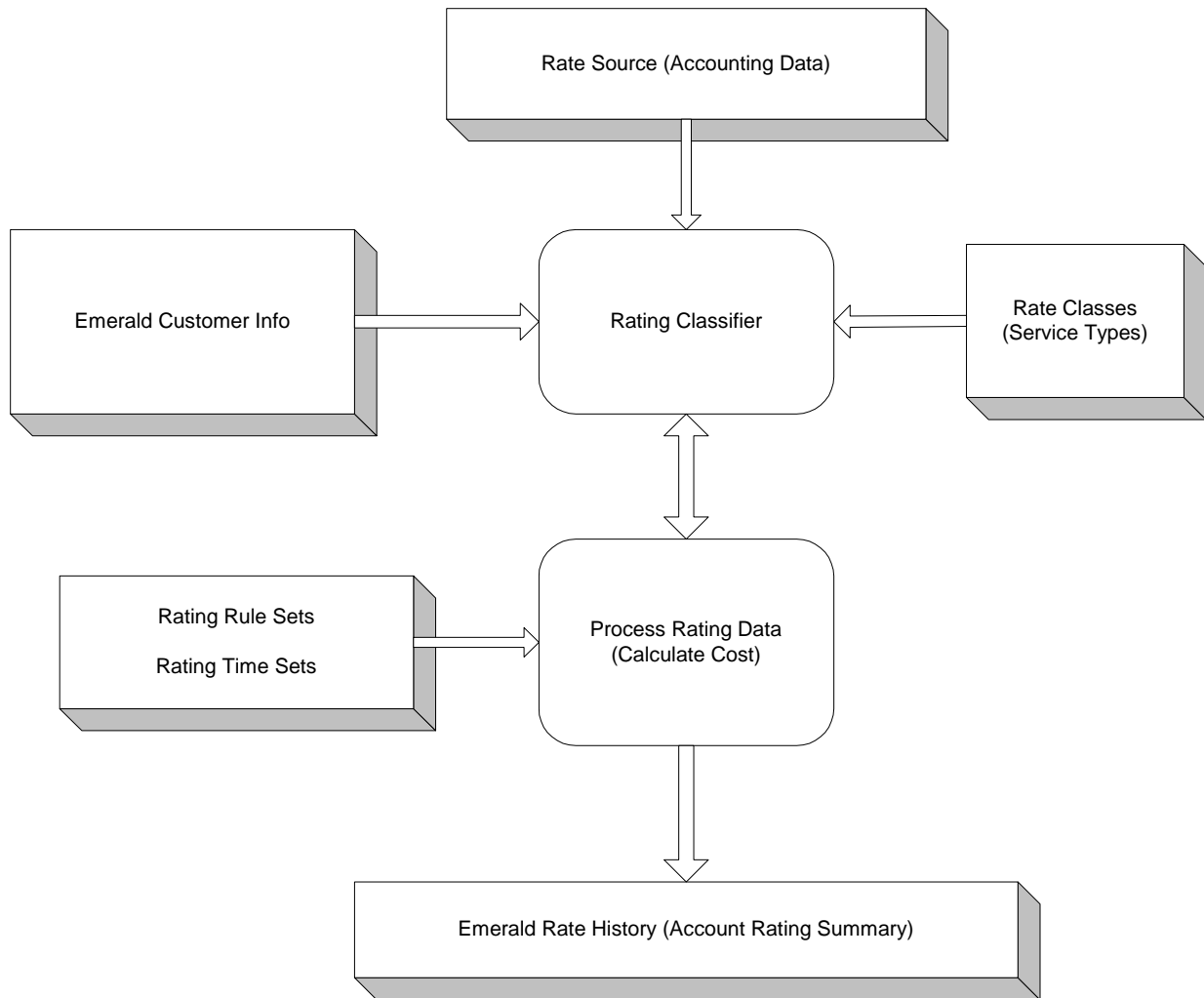
A popular example of rating is rate plans used in the cellular telephone industry where monthly plans include wording such as "300 any time minutes and unlimited night and weekend calling", "$1.00 for the first 20 minutes and .5 cents each additional minute" Emerald provides the framework to enable the configuration of both simple and complex rates and to rate data from a number of disparate sources outside of those included within Emerald.

Before we begin looking into the configuration of the Emerald rating engine it's necessary to become familiar with terms used throughout this section.

| Term	Definition
Rate Source	Refers to the source of data to be rated. Examples of rating sources are "call detail records" and "network flow records"
Rating Classifier	Classifiers are rules used to associate data from a "Rate Source" with specific accounts within Emerald. An example of classification is associating the destination IP Address of a network flow record to a specific MBR/Service or associating an email address or user name to a specific MBR/Service.
Time Set	Represents a grouping of time periods such as "Nights and Weekends", "Holidays" and "Business Hours". These groupings are generally used to apply different costs based on time of day, day of week…etc.
Dimension	Refers to "what" is being rated. In most cases the rating dimension is either "Time" or "Data".

	Examples of a rate in the time dimension is "$1.00 per 5 hours" whereas the data dimension "$1.00 per gigabyte"
Interval	Intervals determine the units rating charges are based. Examples of Intervals are "minutes", "hours", "megabytes" and "gigabytes". Intervals are defined based on "Dimension" relative to the base units provided by a rate source such as "number of seconds" or "number of bytes"
Attribute	Represents a field from the data of a "Rate Source". Examples of fields from a call detail record include "calling number", "called number" and "call duration". Examples of fields from a network flow rate source are "Source Address", "Destination Address", "Source Bytes", "Source Port"..etc.
Rule Set	In simple terms rule sets associate a cost to an interval. An example of a rule set is "10 cents per minute". Or "$1.00 per gigabyte". Rule sets provide configuration of complex rates based on the contents of attributes and or the accounts prior usage history.
Data Rate	A rule set defined in the "Data" "dimension".
Time Rate	A rule set defined in the "Time" "dimension".
Rate Class	Used for the association of Emerald "service types" with a rate. Multiple rates can be assigned to a rate class and multiple service types can be assigned to a rate. Examples of rate classes include "time limited customers", "unlimited network access" or "Priority customers".

The following diagram shows how the Emerald rating engine processes data. Data from the "Rate Source" is "Classified". Next each rate sharing the customers "Rate Class" is executed and the results summarized into Emeralds usage summary database which is later used to generate a usage charge against the customer's account.

```
                    ┌─────────────────────────────────────┐
                    │  Rate Source (Accounting Data)      │
                    └─────────────────────────────────────┘
                                      │
                                      ▼
┌───────────────────────┐      ┌──────────────────┐      ┌───────────────────────┐
│                       │      │                  │      │   Rate Classes        │
│  Emerald Customer Info│ ───▶ │ Rating Classifier │ ◀─── │   (Service Types)     │
│                       │      │                  │      │                       │
└───────────────────────┘      └──────────────────┘      └───────────────────────┘
                                      ▲
                                      │
                                      ▼
┌───────────────────────┐      ┌──────────────────┐
│   Rating Rule Sets    │      │ Process Rating Data │
│                       │ ───▶ │ (Calculate Cost)  │
│   Rating Time Sets    │      │                  │
└───────────────────────┘      └──────────────────┘
                                      │
                                      ▼
              ┌─────────────────────────────────────────────────┐
              │ Emerald Rate History (Account Rating Summary)   │
              └─────────────────────────────────────────────────┘
```

Note a single record from "Rate Source" can be rated multiple times provided that multiple rates are defined and match one of the available classifiers. This is done to support complex rate plans and settlement / reseller environments where multiple customers may be charged at different rates for the same usage record.

The following diagram is presented as a guide to show the dependencies involved when configuring a Rate. We recommend configuring items from the bottom up to in this diagram to ensure you have configured the necessary options at each level streamlining the configuration of rates.
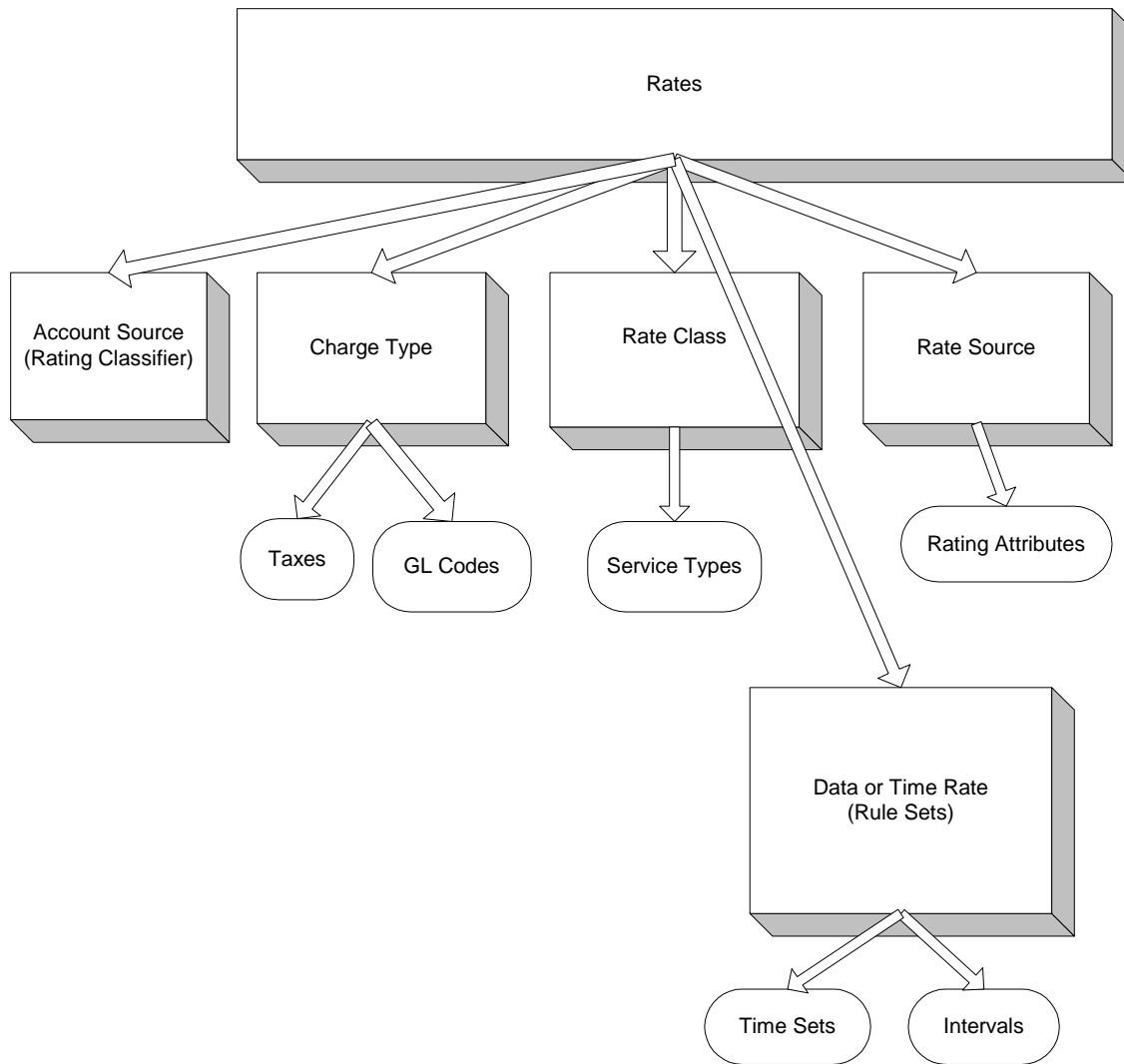
Rates

Rates join together all aspects necessary to cost usage. These include Account Source, Charge Type, Rate Class, Rate Source and Rule Sets. Before proceeding to configure Rates it is necessary to make sure Charge Types, Rate Classes and Rule Sets have first been configured.

Rate Name	Description of the rate
Rating Source	See Admin / Advanced / Rate Sources
Rate Class	Assigned rate class. See Admin / Advanced / Rate Classes
Account Source	Represents the "Rating Classifier". See Admin / Advanced / Rate Classifiers. A helpful description of each account source is displayed as it's selected.
Charge Type	Represents the Emerald charge type used when creating a charge for the accounts network usage. See Admin / Accounting / Charge Types.
Data Rate	Rating Rule used to calculate usage fees based on the "Data" "Dimension"
Rate Auth Requests	When enabled and when rating is enabled in the RadiusNT/X administrator authentication requests are rated to enforce configured usage limits and or calculate a limited session

	duration based on the accounts available balance.
Auth Session Limiting	When Rate Auth Requests is enabled this controls weather a session limit should be imposed based on the accounts available balance. Note that even when session limiting is disabled other forms of session restrictions configured in the Rating Rule still apply.
Auth Max Session Time (Seconds)	Used to enforce a maximum session duration after which the user must re-authenticate to regain network access.
Minimum Monthly Charge	If any network usage is recorded for the users monthly cycle this defines the minimum amount to be charged to the account. Note that if there is no network usage during the users monthly billing cycle a minimum charge is not assessed.
Maximum Monthly Charge	Defines the maximum possible amount that can be charged over the users monthly billing cycle regardless of what costs are defined.
Time Rates	Set of Rating Rules used to calculate usage fees based on the "Time" "Dimension" note that multiple time sets may be defined. When multiple time rates are defined all relevant time rates are used when rating data. If time rates overlap the highest priority followed by the most specific time specification is used for that period.

Rate Classes

The rate class is used to associate one or more Service Types to one or more Rates. Typically for each rate plan a rate class with the same description of the plan will be defined. Once a rate class is configured it is available for selection from any Service Type or Rate.

Rule Sets

In simple terms rule sets associate a cost to an interval. An example of a rule set is "10 cents per minute" or "$1.00 per gigabyte". Rule sets provide configuration of complex rates based on the contents of attributes and or the accounts prior usage history.

Rule Set Name	Descriptive text illustrating the purpose of the rule set
Rating Source	The rate source this rule set is applied to.
Rating Dimension	Sets the "Dimension" the rule set is applied to. "Time" or "Data"
Rating Type	This controls the advanced configuration interface used when clicking the 'Configure' link for a rule set after choosing Admin / Rating / Rule Sets. Normally this is 'Standard Rating'. Other interfaces may be available in the future for application specific advanced configuration of rating rules.
String ID	Provides language support for the rule set name when rendering invoices.
Interval	The "Interval" this rule set is based on.
Per-Session Rounding	Controls per record rounding cost based on Interval and Per-Interval cost.
Default Per-Interval Cost	The default cost per interval, the default cost can be overridden by configuring an advanced rating rule.

"Standard Rating" advanced configuration

Advanced configuration allows rating and authentication decisions to be made based on the contents of "Attributes" in the "Rating Source". The example below uses the Standard Rating interface.

Change Type - The first rule "10 hour discount" provides a small discount after the accounts total session duration has exceeded 10 hours. Note the "Change Type" column for this rule is set to dynamic. "Dynamic" attributes are constantly evaluated throughout the "Dimension" being rated while data in other dimensions are proportionally scaled and averaged in relation to the rated "Dimension". For example let's assume the session being rated has a duration of 2 hours and the users total monthly usage to do has been 9 hours. The first hour of usage is rated at the normal fee of 10 cents per hour. However the second hour of the same session is rated at 9 cents per hour since the 10 hour discount condition has now been met.

Priority - With complex rating rules explicit and implicit priority becomes very important. Let's examine the last two rules defined here - the very expensive rule for 2/HR applies when callers phone number begins with "509" however the extraordinarily expensive rule for 3/HR applies when the caller's phone number is "5093281111" Only one rule can apply at any instant throughout the "Dimension" being rated – so what happens when the conditions of more than one rule matches? The highest priority followed by the most specific rule is chosen. The priority field provides for explicit ordering

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of rules however it is not always necessary or desirable to order rules explicitly such as for the example in this image – a number of factors are combined to determine what the "most specific" rule is. First the number of parameters matched is considered; second the match type combined with relevant information from the Data field. These factors are combined to determine which is the most specific. In the example in this image the rule providing an exact match for "5093281111" is more specific than the rule matching "Begins with 509" since both the type is exact match and the number of characters matched is greater.

Upload Attributes – Upload attributes are special match types, which are not actually used to match a condition and do not have any effect on the calculation of implicit priority. Instead they provide additional output to the rating engine beyond the calculation of cost when they match. Typically upload attributes are used with RADIUS authentication to enforce session limitations thru the rating engine. In the case of the example in this image "IEA prefix lockout" if the callers telephone number "begins with 509444" their RADIUS authentication request is rejected with a reply-message attribute of "Your telephone prefix is currently locked out". You could also configure restrictions for monthly data or time usage. For RADIUS authentication restrictions to be enforced the "Enforce cost-based session limits" option in the Advanced section of the RadiusNT/X admin must be enabled. Upload attributes are also used in the design of rating "Classifiers".

"Voice Destination Rating" advanced configuration

This rating type is used to perform rating of voice calls based on the destination number dialed. There are three main components for voice destination rating: "Destination Sets", "Destination Groups" and "Conditions".

Destination sets provide a grouping of related phone numbers, destination prefix or suffix matching. An example of a destination could be an area such as a state, country or continent. Destinations may also be used to group class of services for example directory assistance and toll free numbers. Each destination set can be merged with like-minded destination sets by way of destination groups. As an example a destination group may be labeled after a country containing many destination sets covering specific geographic areas within that country.

Conditions provide matching rules or authorization changes for destination sets. Examples of conditions used for matching are application of special pricing based on calling number, port or device type. An example of an authorization condition would be to reject RADIUS voice call authorization requests where the dialed number matches a particular destination set or inject any RADIUS reply attributes into the authorization response.

Destination Sets

Description	Text uniquely describing the destination set
Dest Attribute	Rating attribute used to match the destination number or address. In most cases the correct

	attribute will be selected automatically for you. This may be changed if you need to match different criteria such as phone number stored in the User-Name field or the calling rather than called number.
Availability	Controls the scope of availability of this destination set throughout the system. When set "All Rule Sets" all Rating rule sets having the voice destination rating type have access to this destination set. If the destination set is intended to be specific to a single rule set setting availability to the specific rule set will prevent it from being visible to other rating rule sets.
Comments	Descriptive text describing the purpose of the destination set and any important notes operators may need to be aware of.
Sort Order	Enter a numeric value to indicate the display order of this destination set entry. The sort order is used to sort the entries from lowest to highest numerical order.

After defining the destination set multiple destinations can then be added to the set. A destination is a specific number or prefix/suffix with an associated cost. (For example dialing 5551212 costs $.25 per call)

Description	Text uniquely describing the destination number.
NASPortDNIS	This field may be different depending on the selected "Dest Attribute" defined in the destination set above. This field always contains the number, address or prefix/suffix to be matched.
MatchType	Determines the method of matching the Dest Attribute (NASPortDNIS) field. Available options are "Exact Match", "Begins With" and "Ends With". Note that exact match has higher match precedence than begins with or ends with regardless of the number of digits matched.
Interval Cost	Sets per-interval pricing should this destination be matched. The interval is based on the interval of the rule set. Note for destination sets with Global Availability it is recommended all voice rating rule sets share a common interval to prevent confusion with pricing structures.
Interval Option	Controls weather cost multipliers defined at the "Destination Rate" level can effect this destinations pricing.
Bong Charge	Defines a static price charged to initiate the call/session in addition to any per-interval pricing.
Bong Option	Controls weather cost multipliers defined at the "Destination Rate" level can effect this destinations pricing.
Static Cost	Sets the final cost of the entire call/session at a fixed flat rate. When static cost is set Bong Charge and Interval Cost are not used for cost calculations.
Static Option	Controls weather cost multipliers defined at the "Destination Rate" level can effect this destinations pricing.
Country	Optional informational field used to report the country the Destination is associated
State	Optional informational field used to report the state the Destination is associated
City/Location	Optional information field used to report the city or location the Destination is associated
Sort Order	Enter a numeric value to indicate the display order of this destination entry. The sort order is used to sort the entries from lowest to highest numerical order.

Conditions

The configuration of conditions mirrors the "Standard Rating" rating type. Please see the "Standard Rating" advanced configuration section above for information on configuring conditions.

Destination Groups

Destination groups define a set of destination sets enabling high-level configuration of "Destination Rates".

Destination	Destination set to add or update the Destination Group
Condition	Optional condition associated with destination group

Destination Rates
This menu controls which defined destination sets and destination groups are used in the rating process with an option to apply a cost multiplier based on pricing set at the destination level of each destination set.

Destination Set	Destination set to include in the rating rule set
Condition	Condition applicable to selected destination set
Destination Group	Destination group to include in the rating rule set
Multiplier	Optional cost multiplier on each destinations price that allows a cost multiplier to be used.
Comments	Informational message describing the destination rate
Active	When Active the destination rate is included with the rating engines active rule set. When inactive the destination rate is not processed by the rating engine.

Time Sets

Represents a grouping of time periods such as "Nights and Weekends", "Holidays" and "Business Hours". These groupings are generally used to apply different costs based on time of day, day of week…etc.

Description	Natural language description of the configured time. For example 'New Years Day', 'Nights', 'Weekends'
Start Time	If the time is based on time-of-day the start time represents the starting hour and minute the time is to apply.
End Time	If the time is based on time-of-day the end time represents the ending hour and minute the time is to apply. Note if the Ending time is less than the Starting time the period wraps thru the next days ending date.
Months of Year	Months out of the year that applies to this time.
Weeks of Month	Week numbers that apply to this time. Note that the Last week represents the last occurrence within the month.
Days of Week	Days of the week that applies to this time.
Priority	Priority is relative to all time sets applied to a rate. The most specific time having the same priority is used. Specificity is based on both yearly day coverage and daily time coverage of the individual time items within a time set.
Day of Month	If set the time interval applies to the configured day of month only. If not set "Weeks of Month" and "Days of Week" must be configured.

Rating Data Sources

Data sources provide a method of rating many forms of data contained both externally and within the Emerald database. Possibilities include external call detail records, web server access logs, firewall logs and orders. All data must be available via an ODBC datasource and returned in a single ODBC result set. On a per-record or per-query an update query can be executed to mark in the external database the record(s) having been successfully rated. When executing the query all field names available in the ODBC result set are available to be sent back for reference purposes in the update query.

The following diagram shows the process of rating external data.

ID	Internal Data Source ID which uniquely identifies this data source. When selecting a new ID you must choose a number greater than 10,000 all numbers below 10,000 are reserved for future use by IEA Software.
Rating Source	Rate source containing a listing of available attributes and a description of their use and data types within this data source. Rating Sources can be configured from the Admin / Advanced / Rate Sources menu – however this configuration is beyond the scope of this document and basic support services.
Description	Informational field used to describe this data source and intended use.
ODBC DSN	An optional ODBC system data source, if this field is left blank the Emerald database is used.
Use Transactions	This should always be enabled except for cases where the external ODBC data source does not support transactions. Transactions ensure consistency between rating operations and update query and protect against loss of revenue or double charging in the event of database failure.
Username	If an external ODBC DSN is defined this sets the username parameter (UID)
Password	If an external ODBC DSN is defined this sets the password parameter (PWD)
Data Query	Query used to retrieve an ODBC row set of available fields. Field names should contain alphanumeric characters only. The following internal field names hold special meaning to the rating engine and must be used as intended or avoided. Required fields do not necessarily need to be sent if a rating classifier is being used to provide the necessary information.

	Field Name	Required	Description
	RateClassID	Yes	"Rate Class" identifier specifying which rate(s) apply to the data being rated. See Admin / Rating / Rate Classes.
	AccountID	Yes	Emerald service AccountID responsible for generating usage but not necessarily the account charged for usage. See CustomerID below.
	BillDay	Yes	Usually the value of the customers MasterAccounts.BillDay field. Controls the monthly period of which summary records apply.
	Data	For Data Rate	Value of the "Data" "Dimension" this usually refers to the number of bytes, units, etc. being rated.
	AmountLeft	No	Reserved, Not used
	AuthReject	No	Reserved, Not used
	AuthRejectMsg	No	Reserved, Not used
	CustomerID	No	This must only be defined if you need to charge an MBR that is different from the MBR of the AccountID field above.
	StartDate	Start + Stop OR Start/Stop + Duration for Time Rate.	Session starting date used when rating in the "Time" "Dimension" (Must return as an ODBC SQL_TIME or SQL_DATATIME type)
	StopDate		Session ending date used when rating in the "Time" "Dimension" (Must return as an ODBC SQL_TIME or SQL_DATATIME type)
	Duration		Session duration used when rating in the "Time" "Dimension" note that Duration should only be defined if StartDate or EndDate is not available. If both Start and End date are available Duration is ignored.
	SessionTime	MUST NOT set	Internal dynamic variables, Reserved.
	SessionData	MUST NOT set	Internal dynamic variables, Reserved.
	SessionMaxTime	MUST NOT set	Internal variables, Reserved.
	SessionMaxData	MUST NOT set	Internal variables, Reserved.
	Cost	MUST NOT set	Internal variables, Reserved.
	InitialCost	MUST NOT set	Internal variables, Reserved.
	StaticCost	MUST NOT set	Internal variables, Reserved.
	TotalTime	MUST NOT set	Internal dynamic variables, Reserved.
	TotalData	MUST NOT set	Internal dynamic variables, Reserved.
	TotalCount	MUST NOT set	Internal dynamic variables, Reserved.
Update Interval	Controls how often "Update Query" is executed. The two choices available are "Data Query" which means once per execution of the "Data Query" and "Data Row" which means once for each row returned by "Data Query".		
Update Query	Used to mark external data as having been rated in the external database. All field names returned in the rowset from "Data Query" in addition to the following table are available as 'variables'.		

Variable	Description
Cost	The cost of all rates applied directly to the account holders MBR. Costs applied to other MBRs for reseller billing purposes are not included.
MatchStatus	When the values of a rated item are matched explicitly to a rate rule or to the rules default rate MatchStatus is 1. If there are no explicit matches and the default rate is disabled MatchStatus is 0.

Variables begin with the $ character followed by the field name. For example assume a row contains the Field 'CallID' with a value of 1 – 'UPDATE mydb SET LastCallID=$CallID' would become 'UPDATE mydb SET LastCallID=1. Note that string data should prefix the " ' " character before the variable name. Assuming FirstName is "Peter's test" - UPDATE mydb SET FirstName=$'FirstName – handles ODBC SQL quoting requirements for strings to become "UPDATE mydb SET FirstName='Peter''s test'. Native datetime field translation is not possible – you will have to manually convert any timestamp fields to the proper string format.

NOTE: When "Update Interval" is "Data Query" the data in the last row returned is available in the Update Query -- you may need to order the results of the "Data Query" to properly mark all effected rows as having been rated.

Voice Records Data Source

Emerald includes a preconfigured rating data source to enable Call Records from an external source to be easily imported into the Emerald database. This feature operates quite differently than real-time rating processed via RadiusNT/X or the EmerNet traffic collector. The main benefits of using the Voice Record data source is it is simplified to accept external Call Detail information from a variety of sources, per call cost information is available for review by the end user and re-rating of voice records even after they have been applied to an invoice is easily achieved. The disadvantage of using the Voice Record data source is that its not a real-time system and therefore not possible to use this data to actively enforce pre-paid data limits as is possible when RadiusNT/X is used to rate Voice records for real-time calling card applications.

Call record import is accomplished using a data import tool similar to Microsofts DTS Wizard/SSIS or third party utility. All call record data is added to the VoiceCalls table located within your Emerald database for processing.

The table below describes the VoiceCalls table in detail to assist you in mapping your existing call data files to the Emerald database.

Field	Type	Required	User Editable	Description
VoiceCallID	Integer	N/A	**No**	Database assigned unique call identifier.
AccountID	Integer	N/A	**No**	An MBRs service ID the call record is to be billed/associated with. This field is set automatically after the call record is rated.
CallDate	DateTime	Yes	Yes	Starting date and time of the call
Login	String	Yes	Yes	This must match the login field of an MBRs service for billing purposes. If there is no match to a services login field within Emerald the Call record will not be rated. Login is typically the calling number/customer DID.
Duration	Integer	Yes	Yes	Total duration in seconds of the call. Note the ending time of a call is considered to be CallDate + Duration. If the call record is being billed on a data rather than time basis you may set Duration to 0 and use Bytes to specify the amount of data transferred.
SessionRef	String	No	Yes	Optional per call session identifier that uniquely references each call record in the external call data.
CalledNumber	String	No	Yes	For origination this is the number dialed. For termination this should be set to a null value or descriptive string such as INCOMING CALL
CallingPort	String	No	Yes	Optional reference of the hardware port used to originate the call
CalledPort	String	No	Yes	Optional reference of the hardware port used to terminate the call
Bytes	Integer	No	Yes	If billing based on data usage this is the number of billable bytes used.
CallType	String	No	Yes	Optional call type typically used as a hint to the rating system to trigger special pricing conciderations. Examples of call type include local, long distance, voice mail access, information services…etc.
AcctTerminateCause	Integer	No	Yes	Optional RADIUS Acct-Terminate-Cause compatible session termination reason.
CountryID	Integer	No	Yes	UN Country ID from the Emerald Countries table of the number called (origination). If not specified Emerald can periodically attempt to determine the location setting CountryID on a successful match based on internal geographic information. This requires the 'Determine called location for voice calls' scheduled task be enabled. (Procedure RateVoiceCallsLoc)
StateID	Integer	No	Yes	State ID from the Emerald States table of the number called (origination).). If not specified Emerald can periodically attempt to determine the location setting StateID on a successful match based on internal geographic information. This requires the 'Determine called location for

				voice calls' scheduled task be enabled. (Procedure RateVoiceCallsLoc)
Location	String	No	Yes	String describing the location of the number called. Location can be as general or specific as necessary / available.). If not specified Emerald can periodically attempt to determine the location at the city level on a successful match based on internal geographic information. This requires the "Determine called location for voice calls" scheduled task be enabled. (Procedure RateVoiceCallsLoc)
ChargeID	Integer	N/A	**No**	After a call record has been successfully rated and usage charges processed and applied to an account this contains a reference to the usage charge. **Do not make changes to this field.**
ProcDate	DateTime	N/A	**No**	Date and Time this voice record has been successfully rated. If you are importing pre-rated call records that do not need to be rated you may set the ProcDate and Cost fields to signal your records have already been processed.
ErrorCode	Integer	N/A	**No**	If there was an error rating a call record this contains the error code showing this error. Currently the only error code possible is 1 which means there were no applicable rating rules and no default to determine pricing for a specific call.
Cost	Money	N/A	**No**	Actual cost to the end user of this call. This field is determined automatically after the rating process has completed. If you are importing pre-rated call records that do not need to be rated you may set the Cost field to the known cost of the call record. When manually configuring cost you must also set a value for the ProcDate field.

When using the Voice Record data source the following steps should be followed to correctly process call records.

1. Import your call detail records into the VoiceCalls table. Database level constraints ensure the same call records are not accidently imported more than once.
2. From the rating data sources menu click the "test" button on the Voice Records item to do a simulation of the rating process to spot check making sure rates are properly configured.
3. From the same menu click "Process" to process all call records. Periodic processing of call records can be automated by clicking the "schedule" button on the data sources listing for Voice Records.
4. Perform an in-depth review of rated call records by reviewing calls and pricing from the MBRs service call search menu of several accounts to ensure proper rating configuration.
5. If corrections need to be made, make any adjustments and click the "Re-Process" button to re-rate all records not already invoiced and then repeat step 4.
6. Once you have ensured proper rating - process usage charges from the Emerald Client / Billing / Usage Charges menu. This step applies usage charges to the MBRs. These charges will appear on the customers next invoice. This process can be automated by enabling the "Create Usage Charges" scheduled task via the Emerald Admin / Scheduler / Configure Schedules menu. Note the usage charge summary table displays only real-time summaries and does not display information for the VoiceCalls table. Also note that not all pending call detail records may immediately be assigned as charges. This is typically because the call record may fall within a current billing period for a customer and more time needs to pass in order to ensure the user is billed for the

completed period. You may override this behavior via the Emerald Admin / Accounting / Settings / Rating Charge Delay & Rating Allow Interim Charges options.

7. If you discover a rating or data error in an account after it has been billed you may delete the adjustment from the MBRs history menu and "Re-Process" per step 5 above. If the adjustment has already been assigned to an invoice you must first void that invoice and then delete the duplicated usage charge adjustment from the history menu before "re-reprocessing" per step 5 above.

Voice Record Reporting

Rated voice records appear for review in the Emerald operator interface from the Call Search option of each accounts MBR service menu. Customers also have the opportunity to review call history from the Emerald customer account center. Additionally you may enable the attachment of detailed call history to invoices and statements by setting the Invoice Report and Statement Report fields of the desired billing groups (Emerald Admin / Billing Groups) to the included invoice_cdr.rpt and statement_cdr.rpt call detail reports.

Resellers

Admin Resellers Menu

Organizations	Billing Groups	Service Pricing

Organizations

Much of Emeralds support for multiple service providers and reseller billing are based on "Organizations". Organizations are a grouping of "Billing

Organizations

ID	Organization	Reseller Charge MBR	
1	IEA Software, Inc	None - Root Organization	Delete
2	This is a reseller organization	None - Root Organization	Delete

Groups" owned by the same Organization. Organizations separate the monies managed by each company for reporting purposes, define the currency used throughout each organization and provide for the configuration of reseller relationships where an Organization is billed for the services they provide by a parent organization.

Edit Organization

Organization Name: This is a reseller organization

Currency: USD - dollar (United States)

Active MBR Limit:

Reseller Invoice Detail: Detailed invoice

Reseller Monthly Charges: Partial price for partial months service

Reseller Charge MBR: Peter Deacon - IEA Software, Inc. [90]

Select reseller charge MBR | View MBR | Clear MBR selection

[Update]

Organization Name	Reflects the name of the company or branch.
Currency	Determines the currency type of all accounts associated to this organization. This currency information is used for reporting and by some credit card processors.
Active MBR Limit	This option places a limit on the number of Active MBRs that can be associated to the organization. MBR limits are useful for managing the allocation of Emerald MBR licenses.
Reseller Invoice Detail	When billing an Organization for their service usage this option controls the level of detail of the invoice presented to the "Reseller Charge MBR". "Detailed invoice" provides a line item for each service billed. "Summary invoice by service type" provides a smaller summary invoice with a quantity multiplier for each service type used.
Reseller Monthly Charges	When billing an Organization for their service usage this option controls how services created or closed part way through the month are handled. "Partial price for partial month's service" bills at a rate proportional to the fraction of the month the service were active. "Full price for partial month's service" bills the entire monthly rate to the reseller for services that were active for any length of time throughout the month.
Reseller Charge MBR	When billing an Organization for their service usage this option sets the MBR in the parent organization that is to be charged for the service usage of this organization. This MBR generally reflects the reseller.

Service Pricing

Service pricing allows global administrators to set pricing independent of the service types cost field for both what the reseller is charged per service and what the reseller's customers are charged. Resellers with object access to the "Admin" and "Admin Reseller (Customer)" object group are also allowed to configure the amount charged to their customers however they are not able to modify the amount charged to the reseller. NOTE: the "Admin Reseller" object group must never be assigned to a reseller's operator group.

Services

Service Types

Emerald Service Types are used to define the rate plans your organization uses to charge for its services. Service Types allow you to define the billing characteristics of each service including the base recurring cost, usage charges, tax category, setup charge and associated billing group. Additionally, they also allow the pre-configuration of other service account characteristics,

such as providing a default RADIUS and external systems configuration for users of the service type.

Service Type definition relies on the pre-configuration of several other Emerald configuration options including: Taxes, Rates, Charge Types, Billing Groups, and possibly External Systems, DNIS Groups and RADIUS vendor attributes. Therefore, it is recommended that the Emerald Administrator verify that all the necessary pre-configured options are established prior to beginning the Emerald Service Type configuration.

Choosing the **Service Types** Accounting Administrative option will present the display of all existing Service Types. Retrieve an existing Service Type entry for view and/or edit by clicking on the desired entry. To remove a Service Type, click the Delete link next on the selected entry. To add a new Emerald Service Type, click the **New Service Type** link.

The Service Type entry fields are described below.

Service Type	Enter the identifying name for the Service Type. This description will be used within the 'Service Type' selection pick lists throughout Emerald.
Description	Enter a longer comment or description to clarify the Service Type. This description will appear on invoice line items of customers who subscribe to this service.
String ID	Language String ID used to provide multi-lingual support during invoice creation.
Cost	Enter the recurring base cost that will be charged for this service. This is the recurring charge that is applied to the account each service account pay period, regardless of the user's time/data usage. NOTE: Many factors influence the ultimate service price invoiced including discounts, reseller pricing and static service pricing.
Apply Discount	Choose 'Yes' to honor any discount associated with the Service account's Pay Period assignment (refer to the Emerald Pay Period configuration options). Choose 'No' to indicate that members of this Service Type are not eligible for Pay Period discounts.
Setup Charge	Enter the applicable one-time set up charge for this Service Type. Setup Charge options are configured by the Emerald Administrator within the Charge Types administrative option. If a

	setup charge is selected, the charge can be waived during MBR Service account creation. Setup Charges are only applied on the first service billing period.
2nd Setup Charge	Provides an additional setup charge in addition to the above Setup Charge field. If both setup charges are defined both are billed to the MBR on account setup. The secondary setup charge may be used to itemize multiple setup fees and distinguishing tax and non-tax portions of account setup.
Commission	Currently unused. Please see Administrative option General/Sales Person for additional note.
External System	Select the applicable External System to apply to users of this service type. This indicates the external system option that will be used to process charges for this type of account.
Tax Group	Select the applicable Tax Group from the presented selection pick list. The selected Tax Group determines the tax rate applied each service pay period against the recurring cost of the Service (Service Type Cost field). Note: Service usage charges have an independent Tax rate selection assigned based on the Charge Type associated with the Emerald Rate configuration.
Tax Exempt	When an exemption is checked any taxes in the chosen "Tax Group" above that also subscribe to the same exemption are not charged to the customer when invoiced.
Pay Period Discount	When enabled discounts applied to the pay period are honored. When disabled pay period discounts do not apply to the monthly service cost.
Rate Class	If this Service type is to include a Rate structure that additionally charges the user based on time or data usage, select the appropriate Emerald Rate Class to assign to the Service Type. Any Rate Class selection will be billed *in addition* to the recurring service cost specified by the Service Type Cost field. The Emerald Administrator configures Emerald Rates within the Rates administrative option.
Billing Group	If the Service Type is only to be available to MBRs of a specific Billing Group, select the appropriate group from the Billing Group selection pick list. If the 'Global' Billing Group default is accepted, the Service Type will be available to all Emerald MBRs.
Service Group	In addition to Billing Groups, this service type is also accessible to service groups that include "Service Types".
Inactivate service	When an individual service within an active MBR is canceled from the Emerald client or customer center interfaces this setting controls how many days after the cancellation date the state of the account transitions from a 'canceled' to an 'inactive' state. A canceled service **after** its cancellation date has passed is effectively similar to the account placed in an inactive state. The service does not continue to be invoiced and the account cannot be used to access services. There are effectively only subtle differences. Inactive services are eligible for permanent de-provisioning of the underlying service provided to the account holder. For example when inactivated some systems may permanently delete the underlying mail store for an email account. In some cases inactive services may also be eligible to have reserved usernames reused by new customers. Inactive services appear as 'inactive' throughout the Emerald client interface rather than canceled.
Prorate Open Service	When a new service is created for the first time or re-opened this controls how pro-rates are handled. "Partial month" is the recommended default – with this method the new service is pro-rated for the remainder of the accounts billing cycle. "Full month" charges full price regardless of the days remaining in the current billing cycle. "No Charge" does not charge for the prorating the account to its billing cycle.
Prorate Changing To	Similar to "Prorate Open Service" above except this option applies only when an active accounts service type is changed to this service type.
Prorate Closing Service	When closing a service this option determines the credit issued for the remainder of the customer's cycle. Available options are "Unused days and months" credits both portions of the current monthly billing cycle and any unused months from the customers pay period. "Unused

	months" only credits complete unused months and do not credit the remaining portion of the customer's current monthly billing cycle. "No credit" does not credit the account for its unused time. Note that when canceling an account using "No Credit" or "Unused Months Only" the expiration date is set according to what has been paid.
Prorate Changing From	Similar to "Prorate Closing service" above except this option applies only when an active accounts service type is changed from this service type to a different service type.
Start Availability	A starting date when Operators may start using this service type. Before the starting date this service type is not available when creating a new account.
End Availability	An ending date after which Operators may no longer use this service type when creating new accounts. NOTE: The ending date has no effect on accounts already assigned to this service type.
Next Service Type	Used to support "Introductory offers" where a customer signs up and is initially assigned to a service type at a set price, after a period of time "Next After (Months)" option the service is automatically changed to a different non-introductory service type at a different price.
RADIUS Auth fail service	Used with RadiusNT/X to provide an alternative response in the event of an authentication failure. When a Auth fail service type is selected the RADIUS attributes of the selected service type are sent in an "ACK" message rather than a "NACK" possibly providing the user with limited network access enabling them to make changes to or fund their account. When an auth fail service is selected a list of "RADIUS Auth Fail Reasons" appear. When checked and that failure reason occurs during authentication the ACK and service type attributes are sent. When not checked the NACK message is sent. Note that in all cases regardless of the ACK or NACK response an authentication failure is still recorded in the radius log.
DNIS Group	If the Service Type is only able to call into a specific DNIS configuration, enable the DNIS (Dialed Number Identification Service) restrictions by selecting the DNIS Group from the selection pick list. The Emerald Administrator configures the DNIS Group options within the RADIUS administrative option.
Sort Order	Enter a numeric value to indicate the display order of this Service Type entry. The sort order is used to sort the entries from lowest to highest numerical order when the Service Type are presented in selection pick lists throughout Emerald.

Press the **Update** button to save the new or modified Service Type entry.

Setting up Default Settings for Service Types

While creating Emerald Service Types, defaults can be set up for other additional Service account entry fields. When the Service Type is selected during Service account entry, these default values will be automatically filled in on the account in order to provide a complete default configuration for the Service. The Service Type Default Setting entry fields are described below. All Default Setting entries are optional and can be over-ridden on the Service account entry screen.

Login Limit	This field indicates the default number of concurrent logins a Service may establish at one time. Note: Concurrency control must be enabled within RadiusNT/X in order for this feature to work.
Time Left	Used to indicate the default amount of system access time (in minutes) the Service will initially have available at the start of service or each month depending on configuration (See "Admin" / "Accounting" / "Settings" / "Time Left Monthly Update"). This feature relies on the RadiusNT/X Time Banking advanced option in the RadiusNT/X administrator.
Time Renewal	If time left is configured and the "time left monthly update" setting in "Accounting" / "Settings" is enabled this feature determines how often the services time left field is replenished. Available options are monthly based on services billing cycle, daily after midnight

	of each new day or never.
Bytes Left	Used to indicate the default amount of data the service will initially have available at the start of service or each month depending on configuration (See "Admin" / "Accounting" / "Settings" / "Time Left monthly Update"). This feature relies on the RadiusNT/X Time Banking advanced option in the RadiusNT/X administrator.
Bytes Renewal	If bytes left is configured and the "time left monthly update" setting in "Accounting" / "Settings" is enabled this feature determines how often the services bytes left field is replenished. Available options are monthly based on services billing cycle, daily after midnight of each new day or never.
Pay Period	Select from the Pay Period selection pick list provided. This value is used to indicate the default Pay Period for billing of this Service. Pay Periods determine how often the Service will be billed (typically Monthly, Quarterly or Yearly).
Home Dir Size	Used to indicate the default directory size limit of the home directory provided for the user of the service.
Send Bill	Used to indicate the default selection regarding whether the service account should receive a copy of the MBR bill.
Remote Access	Used to indicate the default selection regarding whether the service will be eligible for Remote Access to the Emerald Customer Management Site. "Manager" - allows access to customer account management, one time purchases, billing histories and call detail records of all services within the MBR. "Service" - allows access only to options relating directly to the service the customer is logged in with and does not include customer account management, one time purchases or billing histories. "None" - Remote access using this account is disabled.
GL Code	GL Code for Service Type.

Setting up Default RADIUS Configurations for Service Types

The Emerald Management Suite allows the Emerald Administrator to associate a specific RADIUS attribute default configuration per

Emerald Service Types. This allows RADIUS to apply attributes to specific groups of users, according to service account Service Type. The provided RADIUS configuration will automatically default on every Service created under this Service Type, although the default configuration can be modified and/or added to on an individual Service account basis.

Note:

All Vendor Specific RADIUS Attributes should be configured within the RADIUS Emerald Administrative option prior to attempting to define the Service Type RADIUS default configurations.

Once a Service Type has been created, retrieve it for view or edit by clicking on the entry within the Service Type display window. Any pre-configured RADIUS Service Type Defaults will be displayed at the bottom of the Service Type entry page. To enter a new RADIUS Service Type default, click on the **New RADIUS Service Type Default** link.

The RADIUS Service Type default entry fields are described below.

Vendor	Select the appropriate Vendor from the pre-configured Vendor selection list for the desired RADIUS attribute.

Attribute	Select the appropriate Attribute from the attribute selection list. Only the attributes for the above selected Vendor will be available in the pick list.
Value	Select the desired attribute Value for the from the Value pick list. Only the values for the above selected Vendor/Attribute combination will be available in the pick list. If no Values pick-list is available (no Values currently configured within Emerald for the Attribute), enter the desired value directly in the input box.
Type	Most attributes are reply attributes, meaning they are sent from the RADIUS server back to the RADIUS client in an Access Accept response. However, some attributes can be configured as a check attribute instructing RADIUS server to check attribute received from the RADIUS client against a value. Common check attributes are Caller-ID and NAS-Port-Type to limit a user to calling from a specific device or access technology.

Press the **Save** button to save the new or modified RADIUS Service Type Default entry.

X-Stop Internet Filtering

If you use the 8e6 Technologies' X-Stop Internet filtering service, Emerald also allows the easy configuration of X-Stop filter settings on certain default attributes associated with a Service Type. An X-Stop configuration link will appear on the screen whenever the RADIUS Standard 'Class' Attribute combination is selected from the Radius Attribute selection screen. To add an X-Stop Filter, click on the **X-Stop Filter** link.

Once the X-Stop Filter Configuration window is open, you can specify what categories you would like to block, allow, monitor, etc., for this Service Type RADIUS Attribute default (please consult your X-Stop documentation for information on the filter settings). As filters are entered, the X-Stop configuration value will be updated and presented within the text field at the top of the page. Press the **Update** button to save the entry and return to the RADIUS Attribute Value entry screen. Click the Save button on the RADIUS Attribute Value screen to save the Class attribute value with the auto-configured X-Stop configuration.

For more information on 8e6 Technologies' X-Stop Internet filtering service, access their web page at http://www.8e6technologies.com/.

External Systems

Emerald allows for the configuration of external systems that will synchronize Emerald user information with other types of systems, such as email servers or authentication sources such as UNIX or NT user accounts, or LDAP

ESID	Name	Description	System Type	Service Types		
1	tornado	IIS export	External (LDAP/EmerAuth..etc)	0	Delete	
2	websrv7	Web Server 007	External (LDAP/EmerAuth..etc)	0	Delete	
3	cgpro	CommuniGate Pro	External (LDAP/EmerAuth..etc)	0	Delete	
4	Datacenter on vtest	test test	External (LDAP/EmerAuth..etc)	0	Delete	
5	IIS Export	IIS Export	IIS Web Provisioning	0	Delete	schedule

synchronization sources. The open nature of the Emerald Suite allows many third party applications to easily interact with the Emerald account data. In order to accomplish this interaction, each external system and its type must be defined within the Emerald system. Typical installations of Emerald will not use any external systems.

Choosing the **External Systems** System Administrative option will present the display of the currently configured external systems. Retrieve an existing External System entry for view and/or edit by clicking on the desired entry. To remove an external system configuration, click the Delete link next on the selected entry. To add a new Emerald external system configuration, click the **New External System** link. The Service Types field indicates the number of Service Types that currently have the External System assigned.

The External System configuration fields are described below.

Name	Enter a name uniquely identify the external system. This field is used to associate some external systems by name (LDAP synchronization) rather than ESID.
Description	Text describing the purpose of this external system in detail. Description is used for informational purposes only and is visible when associating service types to external systems.
System Type	Select the appropriate External System Type from the available options presented. Most system types are specific to the system their designed to synchronize to except for the following: • **External**: Used with external systems that provide their own synchronization with Emerald. • **Export**: File or http export of Emerald account information. Requires an export format. System Types are configured from the "Admin" / "Advanced" / "External Sys Types" menu.
Export Format	Select the appropriate export format from the available options presented.
Export Mode	Choose the type of export from the following available options: • **Append**: The exported file will remain and be appended to • **Overwrite**: The exported file will be rewritten each processing cycle.
Mail Host	Enter the name of the mail server that is accepting delivery of mail to these accounts.
Login Password	Enter the login and password values, respectively, for Emerald to login remotely for external system processing, if necessary. Note: Currently these values are only used within Emerald in HTTP(S) post mode to login to the web server.
Log File/URL	Enter the file name or URL of where Emerald should send its export data.

Press the **Update** button to save the new or modified External System entry.

Note:

Some external system configurations should be scheduled within the Emerald Scheduler to keep the external system up to date with changes within Emerald. In these cases, within the External System display will show a "Schedule" link on the system entry that when selected will present the Scheduler Configuration screen.

Service Custom Data Field

The **Service Custom Data Field** option defines extra fields of information tracked with each Service account, or each Service of a specific Service Type within Emerald. The extra

ID	Service Type	Field Name	Default Value	Sort Order	
6	All	Network Software	ibm	0	Delete
10	Netflow	Netflow Collector IP		0	Delete
9	Netflow	Netflow IP Address		0	Delete
7	PPP	Max Message Size	10000000	0	Delete
11	Proxy Realm	Proxy Realm		0	Delete

Service account data fields defined here will be presented within the service detail and edit service screens allowing the Emerald operator to optionally enter a value for each of the additional Service data fields. Service Custom data fields can be informational and used for tracking and reporting or used for things such as supplying additional information to external systems or rating network flow data. Note: In addition to Custom Data fields the association of an external system to a service type may also cause additional custom data fields to appear in the Service account.

Choosing the **Service Custom Data Field** General Administrative option will present the display of all existing Service Custom Data Fields. Retrieve an existing Data Field entry for view and/or edit by clicking on the desired entry. To remove a Data Field, click the Delete link next on the selected entry. To add a new Data Field, click the **New Field** link.

The Service Custom Data Field entry is described below.

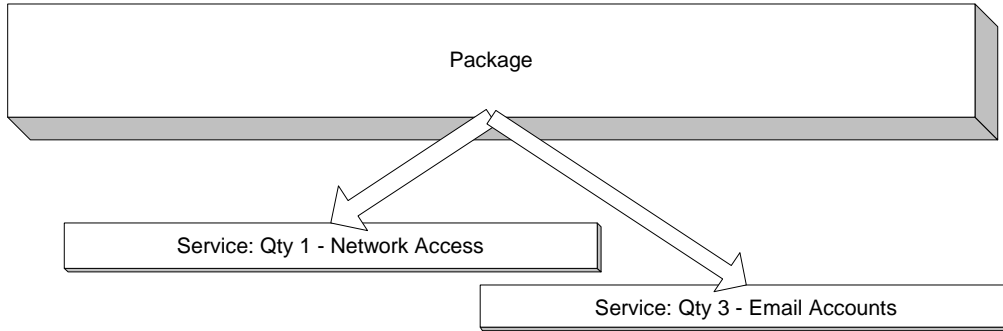| Data Field	Reflects the custom data field to be added. The selection list of available data fields are configured from the "Admin" / "Advanced" / "Acct Data Fields" menu within Emerald.
Default Value	Sets the default value to be set when a new service account is created.
Required	Requires an operator to enter a value for this custom data field before they are able to save changes to the service form.
Service Type	If the Service account custom field is only to be tracked for those services of a specific Service Type, select the appropriate type from the Service Type selection pick list. If the 'All' Service Type default is accepted, the Service custom field will apply to all Emerald MBR Services.
Sort Order	Enter a numeric value to indicate the display order of this Incident State entry. The sort order is used to sort the entries from lowest to highest numerical order when the data types are displayed.

Press the **Update** button to save the new or modified Service Custom Data Field entry.

Package Types

Package Types act to bundle sets of service types together for billing

and customer management purposes. From the billing perspective all services types associated with a package are billed to the package at a set cost and the billing related fields such as expiration and billed thru dates are handled at the package level instead of individual services. Packages are also used for customer signup and the account management section of the customer interface by defining the access rules for customer management.

Package

Service: Qty 1 - Network Access

Service: Qty 3 - Email Accounts

Package Type	Text uniquely describing the purpose of the package type
Cost	Monthly cost of the package
Description	If set this appears as the invoice line item description sent to the customer and also appears as the package name throughout the customer account center. If description is not set Package Type is used as description.
String ID	Provides language support for "Description" above.
Start Date	Starting date after which this package type is available to be selected.
End Date	Ending date after which this package type can no longer be selected when creating new accounts. Note: after end date has no effect on existing accounts having the same package type.
Prorate Open Service	When a new package is created for the first time or re-opened this controls how pro-rates are handled. "Partial month" is the recommended default – with this method the new service is pro-rated for the remainder of the accounts billing cycle. "Full month" charges full price regardless of the days remaining in the current billing cycle. "No Charge" does not charge for the prorating the account to its billing cycle.

Prorate Changing To	Similar to "Prorate Open Service" above except this option applies only when an active package type is changed to this package type.
Prorate Closing Service	When closing a package this option determines the credit issued for the remainder of the customer's cycle. Available options are "Unused days and months" credits both portions of the current monthly billing cycle and any unused months from the customers pay period. "Unused months" only credits complete unused months and do not credit the remaining portion of the customer's current monthly billing cycle. "No credit" does not credit the account for its unused time. Note that when canceling an account using "No Credit" or "Unused Months Only" the expiration date is set according to what has been paid.
Prorate Changing From	Similar to "Prorate Closing service" above except this option applies only when an active accounts package type is changed from the current package type to a different package type.
Customer Access	When "Yes" customers assigned a package of this type who have "Manager" remote access enabled and also have the relevant customer access options enabled (See "Admin" / "Web Interface" / "Customer Settings") are allowed to manage the services within a package of this type. If "No" services assigned to this package type cannot be managed through the customer interface.
Customer Sign-UP	When "Yes" this package type is available for selection by customers signing up for new access via the signup server.
Pay Period Discount	Controls weather discounts on pay periods apply to packages of this type. When "Yes" the pay period discounts apply to the package. When "No" these discounts are ignored.
Tax Group	Tax group used to apply tax on packages of this type.
Setup Charge	When a package of this type is created this option controls the initial setup cost billed to the customer for the creation of the package. When a charge type is selected the default cost of that charge type is used to determine the setup cost.
2nd Setup Charge	Provides an additional setup charge in addition to the above Setup Charge field. If both setup charges are defined both are billed to the MBR on account setup. The secondary setup charge may be used to itemize multiple setup fees and distinguishing tax and non-tax portions of account setup.
GL Code	General ledger code to apply to packages this of type. Used for revenue reporting.
Pay Period	Default pay period set when a package of this type is created. Note this default if specified overrides the MBR default Pay Period setting. When the "Customer Sign-UP" option above is enabled and the signup server is used to create a new MBR and package the selection of a pay period is mandatory. Used directly to set the pay period of the MBR/package created at sign-up.
Billing Group	Limits access to this package type to MBRs of the billing group specified or "All" to allow all groups access.
Billing Cycle	Default billing cycle set when a package of this type is created. When the "Customer Sign-UP" option above is enabled and the signup server is used to create a new MBR including this package type the selection of a billing cycle is mandatory. Used directly to set the billing cycle of the MBR created at sign-up.
Service Group	In addition to Billing Groups, this service type is also accessible to service groups that include "Package Types".
Customer Pay Options	Controls the payment and billing options available from the customer account center for MBRs having a package of this type. Availability of payment options in the customer center are also dependent on account center customer settings (See "Admin" / "Web Interface" / "Customer Settings")
Primary Service Type	Service Type reflecting the main account of a package. The primary account is created during the signup process while additional service types if any are created later after the customer is transferred from the signup process to the account center.

	Note: Due to relationship constraints the Primary Service Type must be selected later after the appropriate "Package Service Types" have been assigned to this package type. See this section below for details.
Signup Send Method	When the "Customer Sign-UP" option above is enabled and the signup server is used to create a new MBR and package the selection of the signup send method is mandatory. Used directly to set the send method of the MBR/package created at sign-up.
Comments	Text describing the package in detail. The comments field is informational and visible only to Operators when configuring Package Types.
Customer Description	This description is displayed during signup while initially presenting a list of package options to choose from. HTML tags such as custom formatting and image links…etc. may be used here. Customer Description must describe in detail what the customer is getting when they select this package and the costs associated with the selection. Additional items such as pay period, billing cycle, billing method..etc. may be included in the customer description.
Customer String ID	Provides language support for "Customer Description" above.
Sort Order	Controls ordering of package types as they appear in selection lists throughout Emerald. Sort Order also helps determine the display order of package types during the customer signup process.

Package Service Types

After a new "Package Type" is created it is necessary to define a list of "Service Types" and access options that combine to define the newly created "Package

Package Service Types								
Service Type	Min Qty	Max Qty	Operator Qty	Customer Qty	Time Left	Login Limit	Non Pkg Discount	
PPP	0	5	7	7			Normal	Delete
ISDN	1	5	7	7			Normal	Delete
EMail	0	5		5			Normal	Delete

Type". To do this edit the package type and choose the "Add Service Type" link from the bottom of the screen.

Service Type	Service type to be associated with this package type. (See "Admin" / "Services" / "Service Types")
Non Package Discount	A discount automatically setup only when a new account having this service type is created from the customer account center and the account is not directly associated to any package type. This becomes useful in situations where you may want to charge separately for each service but provide a discount for having a package. Example Text: "Up to 10 additional email accounts at 50% off with purchase of our premium network access package"
Minimum Services in Package	Minimum recommended services of this type that should be associated with the package. When the recommended minimum is not met a warning is displayed when managing a MBRs services. The condition may also be

	reported on. This feature is designed to minimize the possibility of customers paying for a package having no useable services. Note: No billing decisions are made based on this field.
Maximum Services in Package	Maximum count of services having "Service Type" allowed being associated with a package of this type. Accounts created above this maximum are not associated to the package.
Allow Customer Maximum	Maximum number of accounts having "Service Type" the customer is allowed to add from the customer center. If the allowed maximum exceeds "Maximum Services in Package" above the additional accounts are added as normal services outside of the package.
Allow Customer Set Domain	When "Yes" the customer is allowed to select a domain name from a listing of available domains when adding a new service using the Manage Accounts menu of the customer account center. Note: Listing of available domains is restricted to only those Domains having the Customer Access setting enabled.
Allow Customer Cancel	When "Yes" the customers with "Manager" remote access enabled are allowed to cancel services of this type from the customer center. When "No" the customer is not allowed to cancel services of this type however they may have the ability to cancel their MBR and all subsequent services. See "Admin" / "Web Interface" / "Customer Settings" for more information on customer account center access options.
Allow Customer Add	When "Yes" customers with "Manager" remote access enabled are allowed to add additional services to their account via the customer center. When "No" accounts of this type cannot be created by the customer. See "Admin" / "Web Interface" / "Customer Settings" for more information on customer account center access options.
Allow Customer Change Password	When "Yes" customers are allowed to change their accounts access password. Also when "Manager" remote access is enabled they are allowed to change account passwords of other accounts within the customers MBR provided this field is set "Yes" for the effected service types. See "Admin" / "Web Interface" / "Customer Settings" for more information on customer account center access options.
Allow Customer Change Login	When "Yes" and "Manager" remote access is enabled customers are allowed to change the login names of accounts from the customer account center. See "Admin" / "Web Interface" / "Customer Settings" for more information on customer account center access options.

Prepaid Cards

Prepaid access cards provide a simplified means for customers to purchase and access the services you provide. Emerald supports the following prepaid features:

- **Direct Use Accounts**: These types of accounts allow the user to directly access services using the login and password provided on the pre-paid card without having to go through an initial sign-up process.
- **Signup Server**: The customer signs up electronically -- allowing the collection of the customer information such as name, address, choice of access plans as well as customized access login and password funded by pre-paid card.
- **Rechargeable**: Existing accounts may be "re-charged" by additional pre-paid cards.
- **Integrated Account Generator**: Customizable sequence generator for card numbers and password provide endless possibilities for designing your own card generation algorithms with easy access to a cryptographic quality source of random characters.

- **Batch Types**: Provide for stored profile configuration of a prepaid batch so that similar batch creation runs can easily be executed in the future.
- **Data export**: Prepaid batches are easily exportable in CSV or XML forms.
- **Batch Management**: After a batch is created it can be modified or suspended – additionally utilization statistics are available from the prepaid batches menu.
- **Isolated Organizations**: Prepaid cards created for use with one organization are not useable by members of a different organization.
- **Customer Interface**: Customer center allows the user to automatically purchase additional services, open support tickets and provision new accounts using pre-paid and or a credit cards.
- **Limited Shelf Life**: Prepaid batches can be configured such that cards having not been used over a period of time automatically expire.
- **Enforce Access Limits:** Expiration, session time limits, concurrent access limits and currency based rating required for advanced services such as prepaid telephone cards are possible with Emerald and its integrated pre-paid card management system.

Prepaid Sequences

Sequences are used to generate card login and card password fields used to in the creation of a prepaid batch. The formatting of generated login and password fields are based on the web browsers JavaScript parser allowing you to design custom sequences using the JavaScript language although several formats built-in login and password sequence formats are included with Emerald. When creating a login sequence it's important to make sure the login generated is unique across all prepaid batches in the system. If a duplicate login is generated the prepaid batch creation process fails. Recommend prefixing "$Current.BatchID" and "$floop.Value" (See script parameters in the sequence editor for details) in order to ensure uniqueness of login fields. When creating a password sequence it's very important to generate passwords which don't follow a guessable pattern.

| Description | Text describing the type and purpose of the sequence |

Login Use	When set Yes the sequence is intended for use to generate the card login field. It is recommended on a per-sequence basis login or password is selected but not both.
Password Use	When set Yes the sequence is intended for use to generate the card password field. It is recommended on a per-sequence basis login or password is selected but not both.
JavaScript Header	This is generally used to define JavaScript functions that will be called from the JavaScript field. An example of this is a credit card format number generator.
JavaScript Field	This JavaScript code is executed once for each card generated in a prepaid batch. See "Script Parameters" in the sequence editor for more information on available helper variables.

Prepaid Batch Types

Batch Types act as profiles storing much of the configuration of a prepaid batch run so that similar batches can be easily created in the future. At least one batch type must be created before a prepaid batch can be generated.

Prepaid Card Batch Types

Description	Group	Inactive Expire	Active Expire	Direct Use	Prepaid Amount	Direct Amount	Login Sequence	Password Sequence	
Non direct test	Group t3		180	No			Credit Card Compatible (16 digit)	Numeric Password (10 digit)	Delete
Second option	group 2	220	90	Yes	3.50		Credit Card Compatible (16 digit)	Credit Card Compatible (16 digit)	Delete

Edit Prepaid Card Batch Type

Description: Example batch type
Inactive Expire Days: 220   Active Expire Days: 90
Login Sequence: Credit Card Compatible (16 digit)   Password Sequence: Numeric Password (10 digit)
Prepaid Credit Amount: 3.50   Allow Direct Use: Yes
Default Batch Size: 100   Billing Group: group 2

Service Type: PPP   Pay Period: Quarterly
Send Method: Email PDF   Billing Cycle: Non-Recurring
Domain: peterd.ws   Discount: Normal
Time Left: Bytes Left:
Direct Credit Amount:
[Update]

Description	Text describing the purpose and use of the batch type
Inactive Expire Days	Controls the "Shelf Life" of a prepaid card. When set any cards that have not been activated before "Inactive Expire Days" of the prepaid batch creation are disabled and no longer useable.
Active Expire Days	For "Direct Use" accounts set the expiration date of the account after its creation. When the pre-paid card is not used as a direct use card the Active expire days field is ignored.
Login Sequence	"Sequence" used to generate the "Card Login" fields of a pre-paid batch.
Password Sequence	"Sequence" used to generate the "Card Password" fields of a pre-paid batch.
Prepaid Credit Amount	Amount available when using the prepaid card to make payments against an existing account or when using the prepaid card through the Emerald signup server to create a new account. Note that after any amount is taken from a prepaid card it is no longer possible to use the prepaid card for "Direct Use". Similarly when a prepaid card is used as a "Direct Use" card the Prepaid Credit Amount is not available. To provide a credit amount to "Direct Use" accounts see the "Direct Credit Amount" field below.
Allow Direct Use	When enabled "Direct Use" of the prepaid card is allowed. Direct use is the ability to

	authenticate via RADIUS using the cards login and password to gain network access without having to take any further steps such as going through a "Sign-Up" process.
Default Batch Size	By default the number of prepaid cards to be generated per pre-paid batch run. NOTE: As with most options default batch size can be overridden during the creation of a prepaid batch.
Billing Group	Billing Groups serve two purposes. First when a prepaid card is used for "Direct Use" this determines which billing group the new "Direct Use" MBR will be associated with. Second, billing group restricts non "Direct Use" uses of the pre-paid card to accounts which share the same Organization as the selected billing group.
Service Type	Applies to "Direct Use" accounts only. Service Type of new Direct Use account.
Pay Period	Applies to "Direct Use" accounts only. Pay Period of new Direct Use account.
Send Method	Applies to "Direct Use" accounts only. Send Method of new Direct Use account.
Billing Cycle	Applies to "Direct Use" accounts only. Billing Cycle of new Direct Use account.
Domain	Applies to "Direct Use" accounts only. Domain of new Direct Use account.
Discount	Applies to "Direct Use" accounts only. Discount of new Direct Use account.
Time Left	Applies to "Direct Use" accounts only. Time Left of new Direct Use account.
Bytes Left	Applies to "Direct Use" accounts only. Data remaining of new Direct Use account.
Direct Credit Amount	Applies to "Direct Use" accounts only. Available balance of new Direct Use account.

Prepaid Batches

The prepaid batch menu allows the creation of new prepaid batches by clicking the "Generate Batch" button under prepaid batches. Additionally all

			Prepaid Card Batches								
ID	Description	Group	Non-Use Expire	Credit Amount	Total Credits	Avail Credits	Total Accts	Used Accts	Direct Use	Operator	Status
43	Peters prepaid batch	Group t3		3.50	350.00	346.50	100	1	Allowed	admin	active

previously created card batches are available from this menu as well as usage statistics of each batch. By clicking on an existing batch all prepaid cards in that batch and the status of each are displayed.

Batch Type Template	Choose a prepaid batch type to be used as a template for generating the prepaid batch.
Description	Text uniquely illustrating the purpose of the new prepaid batch.
Login Prefix	Static prefix prepend to the card login field of all prepaid cards generated in this batch
Login Parm 1	Optional parameter reserved for custom purpose.
Password Parm 1	Optional parameter reserved for custom purpose.

Password Parm 2	Optional parameter reserved for custom purpose.
Range Start	Starting number used for prepaid batch generation
Range End	Ending number used for prepaid batch generation. Number of prepaid cards created in the batch is equal to "Range End" minus "Range Start"
***	See Prepaid Batch Types above for descriptions of the remaining options in prepaid batches.

Reports & Logs

This menu provides for the configuration of the Emerald reporting system and log management.

Settings

Provides system wide configuration to specify which print engines are installed and useable as well as engine specific configuration options.

Enable Crystal Reports Print Engine	Enables the use of the Crystal reports for report rendering.
Enable Emerald Print Engine	Enables the use of Emerald for report rendering.
Default Print Format	Unused – reserved
Auto close reports when not in focus	When 'Yes' once the report loses focus and is no longer in the foreground the report window is automatically closed. When 'No' the report remains open in the background window.

It is recommended this option remain enabled to prevent users from forgetting about report windows in the background and having new reports display in background windows hidden from view. |
Text Export CPI	Unused – reserved
Reports Directory	Unused – reserved
Crystal Reports Server URL	When using a remote crystal reports web print server for report rendering this sets the access URL to the emerprint.asp print file installed on that server.
Crystal Reports Server Report Directory	When using a remote crystal reports web print server for report rendering this sets the location of the report files on that server.

Reports

At any time, custom reports can be created against the Emerald user database to expand upon the set of standard reports that the Emerald Management Suite provides. Custom reports are created and managed independently by your organization and can therefore be tailored towards your specific informational needs.

ReportGroups				
Report Group	**Description**	**Operator Group**	**Reports**	
General	General		3	Delete
Accounting	Accounting Reports		9	Delete
Users	User Reports		3	Delete
RADIUS	RADIUS		3	Delete
System	System Reports		5	Delete

On Windows systems, and if using Crystal Reports, after a custom report has been created, it can be configured as one of the regular selections available to the Emerald Operators under the Emerald 'Reports' main menu option.

Reports			
Report	**File Name**	**Type**	
Check Deposits	deposit.rpt	Custom	Delete
Daily Payments	payments.rpt	Custom	Delete
Expiring Credit Cards	ccexpires.rpt	Custom	Delete
Failed Transactions	badtrans.rpt	Custom	Delete
GL Payments	glpayments.rpt	Custom	Delete
Recurring Revenu Forecast	forecast.rpt	Custom	Delete
Revenue By Service Type	serv_rev.rpt	Custom	Delete
Sales Commissions	commission.rpt	Custom	Delete
Tax Payments	taxpayments.rpt	Custom	Delete

Choosing the **Reports** System Administrative option will present the display of the existing report set (including both the standard Emerald reports, plus any custom reports that may have been added). Retrieve an existing Report entry for view and/or edit by clicking on the desired entry. To remove a Report option, click the Delete link next on the selected entry. To add a new Emerald Report, click the **New Report** link.

Reports	
Report:	Recurring Revenu Forecast
File Name:	forecast.rpt
Type:	Custom	Report Group: Accounting
Billing Group:	All	Sort Order: 0
	Update

The Report entry fields are described below.

Report	Enter an identifying description of the Report. This description will be used within the 'Report' selection pick lists throughout Emerald.
File Name	Enter the actual filename of the report. This file should be located in the emerald report folder. The file extension of the report may be left as .rpt even when the actual report file is an Emerald report having a ews file extension. This allows for the same report definition to use either Emerald for report rendering or a third party reporting system such as crystal reports depending on which reporting engines are enabled and the format requested by the operator when printing the report.
Type	When "Custom" the report is available for display as a custom report in the custom report listing. When "System" the report is intended to be used by Emerald for the rendering of internal features such as statements and invoices.
Billing Group	Allows restricting of which Operators (via their allowed Billing Groups) can view the report.
Operator Group	Allows restricting of which Operator Groups can view the report.

Press the **Update** button to save the new or modified Report entry.

Once a report has been added to a report group you may assign any parameters those running the report should be prompted to set before the report is displayed. General examples of

Report Parameters				
Field	**Required**	**Sort Order**	**Description**	
Organization	No	1	Listing of Avaliable Organizations	Delete
Billng Group	No	2	Listing of avaliable Billing Groups	Delete
Forecast Month	Yes	3	forecast.rpt	Delete

parameters would be Organization, Billing group, date ranges for reports that look at account usage over time and

forecast.rpt Parameters	
Field:	Organization (Listing of Avaliable Organizations)
Required:	No	Sort Order: 1
	Update

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parameters to limit the relevant number of results. The report parameters usable by a report are specific to each report. See "Report Fields" below for more information on defining additional parameters for custom reports.

A report parameter marked required must have a value entered before that report can be run. Most report parameters are optional.

Report Fields

When running a custom report it may be necessary to prompt the operator to answer various questions so that the report displays data relevant to the operators query. For example a report that shows all call records for a period of time may ask for starting and ending dates to show the call information as well as restricting the call record display to a subset of accounts based on region, billing group, organization or other criteria. To accomplish this report fields are configured through the report field's editor shown below. After this has been completed the new fields are available to be assigned to reports. (See report groups above)

Report Fields

ID	Field Name	Data Type	Description
1	Organization	EWS Template	Listing of Avaliable Organizations
2	Billng Group	EWS Template	Listing of avaliable Billing Groups
3	Starting Date	Date & Time	1st of last month (PeriodStart)
4	Starting Date	Date & Time	1st of two months ago (PeriodStart)
5	Ending Date	Date & Time	1st of last month (PeriodEnd)
6	Ending Date	Date & Time	1st of two months ago (PeriodEnd)
7	Starting Date	Date & Time	Yesterday
8	Ending Date	Date & Time	Tomorrow
9	Operator	String	Operator search field
10	Forecast Month	Date & Time	forecast.rpt
20	Starting Date	Date & Time	1st of 12 Months Ago
21	EndingDate	Date & Time	End of 12 months ago (PeriodEnd)

Edit Report Field

Field ID: 4
Field Label: Starting Date
String ID:
Description: 1st of two months ago (PeriodStart)
CR Field: EWS Field: StartDate
Data Type: Date & Time
Default Value: $m2.PeriodStart

[Update]

Field ID	Unique ID representing this field. If you are adding custom report fields the field ID must be larger than 10000. 10,000 and below are reserved for IEA Software use only.
Field Label	Field name to display to the user
String ID	Provides language support for "Field Label" above.
Description	Text describing the use of this field and optionally default value
CR Field	Crystal reports field name
EWS Field	Emerald report field name
Data Type	"Numeric" – Data entered must conform to a numeric value "String" – Data entered can contain alphanumeric characters "Date & Time" – Data entered is a date or date and time field "EWS Template" – Data field display based on EWS template file. See Emerald Web Extensions guide for information on creating ews template files.
Default Value	Default value of this data field
EWS File	When Data Type is "EWS Template" this represents the ews template name to use.

System Log Filters (Sys Log Filters)

Emerald provides the ability to filter the system messages that get saved within the Emerald System logs. A System Log Filter can be defined to "filter out", or ignore, certain system messages that do not need to be recorded in the log detail file.

Choosing the **Sys Log Filters** System Administrative option will present the display of the currently configured system log filters. Retrieve an existing system log filter entry for view and/or edit by clicking on the desired entry. To remove a system log filter, click the Delete link next on the selected entry. To add a new system log filter, click the **New SysLog Filter** link.

The System Log Filter entry fields are described below.

IP Address	Enter the IP address of the server to which this filter applies. Wildcards are allowed within the IP string in order to filter upon IP Ranges (for example, '207.53.*'. If it is a global filter and applies to all system servers, then enter just the wildcard symbol '*'.
Severity	Select the appropriate system message error type from the available options presented. The severity options are pre-configured and match the types of Emerald system messages that occur during system operation.
Match String	Enter the text string indicative of the messages that you would like filtered from the system log when they are received. The Match String entry is not case sensitive (for example, 'h' will match both 'h' and 'H') and will match partial fragments (for example, 'login' will match and filter all system messages that contain the word 'login'.)

Press the **Update** button to save the new or modified System Log Filter entry.

Log Trimming

The Logs Global option provides the configuration for the maximum number of days in which to store the Emerald log and other table entries within the system. Choosing the Logs Global Administrative option will present the display of the current logging configuration. Retrieve an existing attribute value for view and/or edit by clicking on the desired entry. When the Description value is clicked within the Log Configuration display window, an entry box prompting for the new Value entry for the option will be presented. The Description indicates the log file name, and the Value field is always in number of days the log entries will be stored within the system. Warning: The trimmed records are permanently deleted from the system.

The Logs Configuration options are described below.

Description	Indicates the name of the individual log file.
Value	Enter the number of days for which to keep the log entries stored within the system.

Press the **Update** button to save any new or modified Logs option value changes.

RADIUS

Much of the RadiusNT/X component configuration is stored in Emeralds centralized database. However RadiusNT/X also maintains a local configuration used among other things to determine connectivity to the Emerald database and control which features are enabled. Please see the RadiusNT/X administrator and the RadiusNT/X Users guide for more information on the local configuration of RadiusNT/X.

Note:

In order for many of the Emerald Administrative RadiusNT/X options to function correctly after configuration, features may have to be enabled on each RADIUS server using the RadiusNT/X Administrator. RadiusNT/X option availability and feature performance may also be affected by the type and capabilities of your NAS (Network Access Server). Therefore, it is strongly recommended that you be familiar with both your RADIUS server configuration and NAS setup when going through this section.

Vendors (Vendor Attributes)

Vendor Attributes are the set of RADIUS attributes and values commonly known as a RADIUS dictionary. The purpose of the dictionary is to translate and define the RADIUS numerical information into human understandable descriptions. Each RADIUS attribute is associated with a particular NAS Vendor, an attribute identifier and associated attribute values.

RadiusNT/X is pre-configured with a standard set of RADIUS attributes that should work for most Network Access Server (NAS) vendors. If your NAS requires a change or additional attributes, the user can add or delete the list of attributes as needed. Please consult your NAS documentation for information on supported attributes.

Choosing the **Vendors** RADIUS Administrative option will present the display of the currently configured RADIUS vendors. Retrieve an existing RADIUS Vendor for view, edit or attribute definition by clicking on the desired entry. To remove a RADIUS Vendor, click the Delete link next on the selected entry. To add a new RADIUS Vendor, click the **New RADIUS Vendor** link.

The RADIUS Vendor entry fields are described below.

ID	Enter the IANA enterprise number for this Vendor. Note: The Vendor ID numbers are standard and should be supplied within your NAS documentation.
Name	Enter the identifying descriptive name of the

RADIUS Vendor.

Press the **Update** button to save the new or modified RADIUS Vendor entry.

Note:

Before adding a new RADIUS Vendor entry, consult your NAS documentation to find out whether it supports the standard vendor specific attribute format. If it does not, RadiusNT/X may not be able to properly handle attributes from that vendor unless they appear in the standard Emerald-provided Vendor list.

Defining Vendor Attributes

Attributes are associated with RADIUS Vendor entries. To add or display the RADIUS attributes specific to a particular Vendor, click the Name field of the Vendor from the Radius Attribute Vendors display window.

Attributes (RADIUS Standard)

Name	Attribute ID	Attribute Type	
User-Name	1	String	Delete
Password	2	String	Delete
Challenge-Response	3	String	Delete
NAS-Identifier	4	IPv4 Address	Delete
NAS-Port	5	Integer	Delete
User-Service	6	Integer	
Framed-Protocol	7	Integer	
Framed-Address	8	IPv4 Address	Delete
Framed-Netmask	9	IPv4 Address	Delete
Framed-Routing	10	Integer	

RADIUS Attribute
Attribute ID: 7
Name: Framed-Protocol
Attribute Type: Integer
Reply Type: Reply
Alias Vendor: None
Alias Attribute: None
Update

Once a Vendor has been selected, all Attributes associated with the Vendor will be presented. Retrieve an existing Attribute for view, edit or Attribute Value definition by clicking on the desired entry. To remove an Attribute, click the Delete link next on the selected entry. To add a new Attribute entry, click the **New Attribute** link. The Vendor Attribute entry fields are described below.

Attribute ID	Enter the Attribute ID value. Please check with your NAS documentation for information on entering the correct value.
Name	Enter the appropriate Attribute name. Please check with your NAS documentation for information on entering the correct value.
Attribute Type	Select the appropriate type from the selections offered in the pick list. Please check with your NAS documentation for information on entering the correct value.
Reply Type	Select the appropriate Reply Type from the selections offered in the pick list. Please check with your NAS documentation for information on entering the correct value. Note: 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.
Alias Attribute Alias Vendor	These fields are used by RADIUS when recording accounting data to the Calls table to impersonate a selected attribute. This way you don't need separate columns in the Calls table for each Vendor attribute that share common functionality with another attribute. See the RadiusNT/X documentation for more information on alias attribute functionality. Choose the Vendor and Attribute values from the provided selection lists.

Press the **Update** button to save the new or modified Vendor Attribute entry.

Quick Tip:

You should consult your NAS documentation to find out what attributes and what values it supports. Not all RADIUS clients support all RADIUS attributes.

Defining Vendor Attribute Values

Attribute Values are pre-defined names representing numerical RADIUS attribute identifiers. This allows you to select options based on easier to understand names, rather than remember the numerical value.

Values	
Value	**Name**
1	PPP
2	SLIP
3	ARA
4	Gandalf
5	Xylogics
7	GPRS-PDP-Context
9	PPTP
256	MPP

Once you have selected a specific Vendor Attribute from the list, you will see a list of the current values for that Attribute. Retrieve an existing Attribute Value for view or edit by clicking on the desired entry. To remove an Attribute Value, click the Delete link next on the selected entry. To add a new Attribute Value entry, click the **New Value** link.

The Attribute Value entry fields are described below.

Value	Enter the Attribute Value. Please check with your NAS documentation for information on entering the correct value.
Name	Enter the appropriate Value name. Please check with your NAS documentation for information on entering the correct value.

Press the **Update** button to save the new or modified Attribute Value entry.

Server Groups/Servers/Server Ports

Server Groups are used to group sets of servers that have similar characteristics or function. Choosing the **Server Groups** RADIUS Administrative option will present the display of the currently configured Server Groups. Edit an existing Server Group by clicking on the desired entry. To remove a Server Group, click the Delete link next on the selected entry. To add a new Server Group, click the **New Server Group** link. Once created, Servers can be assigned to the group on the Server entry screen.

The Server Group entry field is described below.

Server Group	Enter an identifying name for the Server Group.

Press the **Update** button to save the new or modified Server Group entry.

Defining Servers under a Server Group

After creating a Server Group, individual Servers can be created and assigned to the group. **Each**

RADIUS Servers							
Server	**Server Type**	**IP Address**	**Location**	**Ports**		**Security**	
seattle	Generic Start at 0	10.0.8.1	Peters house	100/0	Create	Ignore	Delete

Network Access Server (NAS) that will interact with Emerald must be defined within the system. Select a Server Group from the Server Group list to display all Servers currently configured for that group. Retrieve an existing Server entry for view and/or edit by clicking on the desired entry. To remove a Server, click the Delete link next on the selected entry. To add a new Server entry, click the **New Server** link.

The **Create** link within the Ports column is specific to the Server entry screen, allowing the user to indicate to the system to automatically create the Server Ports entries for the particular Server entry. If the Create link is selected, the system will delete any existing Port entries for the Server and auto-generate a complete set of new Port entries according to the 'Server Type' of the Server entry. The Port display presents two port indicators formatted as the "number of specified ports/number of port entries that currently exist within the system" for each Server entry. The Server entry fields are described below.

Server	Enter an identifying name for the Server. This can be either the fully qualified domain name (FQDN) of the NAS, or just the hostname of the NAS.
Server Group	Select the Server Group that applies to this Server entry. The default is the currently selected Server Group.
Server Type	Server Type is intended for backwards compatibility with previous generation of access technologies using SNMP rather than RADIUS dynamic authorization for Disconnect messaging. For all access servers of all types select **None** from the list. If the client is an Emerald server select 'IEA Software – Emerald Client'. If the client is a RadiusNT/X server select 'IEA Software – RadiusNT/X Server'. For ALL other RADIUS clients and access servers choose **None**. Note: None is the same as selecting Generic Starts at 0.
IP Address	Enter the machine IP Address.
Secret	Enter the shared RADIUS secret between the NAS (RADIUS Client) and RadiusNT/X. This must be exactly the same as configured on the NAS itself. Refer to the RadiusNT/X documentation for more information on RADIUS Secrets. A 16 or more character random shared secret containing letters, numbers and symbols is recommended.
Community	Enter the SNMP community of the NAS, and is used for the SNMP functions of RadiusNT/X. This is for backwards compatibility only and is normally left empty.
Location	Enter the location of the server for informational purposes only.
Ports	Enter the total number of physical or logical ports the NAS is able to manage. If the NAS

	does not have a fixed count of ports or you don't know how many Ports exist set Ports to 0. Ports are used for reporting purposes only and can be safely ignored.
Modems	Enter the number of server modems. Used for reporting purposes only.
Phone Number	Enter the server access phone number This is the DNIS number access number if applicable. The Phone Number field is used for informational purposes only.
Contact Name	Enter the name of person in charge of administering the server.
Contact Phone	Enter the phone number of the Contact person for the server.
Contact Page	Enter the pager number of the Contact person for the server.
Comments	Enter any description or comment regarding the server or its configuration.
Dynamic Start Dynamic End	Used for informational purposes to define the primary IP Address pool the NAS will use (this is not sent to the NAS) and has no effect on authentication.
Rad Roam Server	By selecting a roam server, all requests from this server will be automatically forwarded to the selected roam server and NOT processed locally. Use of this feature requires proxy be enabled in the RadiusNT/X administrator.
Server Access	When server access is enabled in the advanced menu of the RadiusNT/X administrator this controls the default access rule for this server. "Allow All Unless Specified" allows full access to all service types with RADIUS attributes and all ports unless there are specific deny rules defined. "Allow none unless specified" denies all access and requires access rules before any authentication attempts can be succeed for this access server.
Acct Port	If this server entry is used to reflect a RADIUS server or internal client such as the "Emerald Client" and "RadiusNT/X" Server Types the Acct port reflects the UDP RADIUS accounting port of the server.
Auth Port	If this server entry is used to reflect a RADIUS server or internal client such as the "Emerald Client" and "RadiusNT/X" Server Types the Auth port reflects the UDP RADIUS authentication port of the server.
Disconnect Port	If this access device supports RFC3576 Disconnect or COA messages this reflects the Disconnect UDP server of the access device. Note that if disconnect port is specified Emerald will issue disconnect messages when sessions are cleared for this access device in the online sessions report in the "Client" / "Reports" menu.
Concurrency Checking	When "Enabled" and when the Concurrency checking feature is enabled in the advanced menu of the RadiusNT/X administrator concurrency checking is performed for authentication requests made from this access server. Otherwise if "Disabled" or concurrency checking is not enabled in the advanced menu of the RadiusNT/X administrator concurrency checking is not done for requests made to this access server.
Disconnect Attributes	For access servers supporting receipt of CoA/Disconnect messages to terminate active sessions this option controls which session identifying attributes are sent to the access server to identify and disconnect a unique session via the Emerald session manager or Manually via the emerald online list. Since some access devices may not accept disconnect requests with all of the attributes provides you may uncheck those attributes the access device will not accept. If you are experiencing problems with disconnect try unchecking the Caller-ID and NAS-Port-DNIS attributes. (Calling-Station-ID and Called-Station-ID) Note: Acct-Session-ID is always sent and cannot be disabled.

*Denotes required field

Press the **Update** button to save the new or modified Server entry.

Server Ports

In order for Emerald to track accounts on-line and control login permissions, the system needs to be aware of each port on

Ports					
Port	SNMP OID	Current NAS-ID	Current User	Current Status	Current Session-ID
257	.1.3.6.1.4.1.307.3.2.1.1.1.4.257	10.0.3.2	peterd	Inactive	00000002
258	.1.3.6.1.4.1.307.3.2.1.1.1.4.258	10.0.3.2	peterd	Inactive	00000005
259	.1.3.6.1.4.1.307.3.2.1.1.1.4.259	10.0.3.2	peterd	Inactive	00000005
260	.1.3.6.1.4.1.307.3.2.1.1.1.4.260	10.0.3.2	peterd	Inactive	00000006
261	.1.3.6.1.4.1.307.3.2.1.1.1.4.261	10.0.3.2	peterd	Inactive	00000008
262	.1.3.6.1.4.1.307.3.2.1.1.1.4.262	10.0.3.2	peterd	Inactive	0000000B
263	.1.3.6.1.4.1.307.3.2.1.1.1.4.263	10.0.3.2	peterd	Inactive	0000000D
264	.1.3.6.1.4.1.307.3.2.1.1.1.4.264	10.0.3.2	peterd	Inactive	0000000F
265	.1.3.6.1.4.1.307.3.2.1.1.1.4.265	10.0.3.2	peterd	Inactive	00000011
266	.1.3.6.1.4.1.307.3.2.1.1.1.4.266	10.0.3.2	peterd	Inactive	00000014

each server. By default, these entries can be auto-generated according to Server Type when the Server is created using the Server entry screen **Create** Port option.

Once generated, Server Port information can be edited, but changes to the automated Server Port configuration, outside of modifications to the SNMP configuration of the port, is generally not recommended. Additionally note, that when a Server entry is deleted, all associated Port entries for that Server will also be deleted.

Retrieve an existing Server Port entry for view and/or edit by clicking on the desired entry. To remove a Server Port, click the Delete link next on the selected entry. To add a new Server Port entry, click the **New Server Port** link. The Server Port entry fields are described below. Note: Under most cases Ports are dynamically added and removed based on demand. It is not recommend Ports be added or removed manually except if necessary when configuring SNMP concurrency checking.

Port	Enter the Port identification number. The value must match what the NAS will return in the NAS-Port attribute for accounting requests. Note: Run RadiusNT in –x15 debug mode to see an example of these values.
SNMP User	For backwards compatibility only. This field should normally be left blank. Used by RadiusNT/X when doing SNMP concurrency checking. Represents SNMP OID of attribute containing the status of this port. See the RadiusNT/X documentation for more information on SNMP functionality.

Press the **Update** button to save the new or modified Server Port entry.

Server Security/Port Access

Emerald and RadiusNT/X allow access restrictions to be placed at the Server Port level. Once a Server and its Ports have been defined,

select the Server for edit to define specific access levels for specific Server Ports.

Retrieve an existing Server Access entry for view and/or edit by clicking on the desired entry. To remove a Server Access entry, click the Delete link next on the selected entry. To add a new Server Access entry, click the **New Server Access** link. Note: Entries defined for 'All' Ports cannot be directly edited. Modify these entries by deleting and then re-entering the information. The Server Access entry fields are described below.

Access Rule	"Allowed" means access is granted when all of the criteria below is met. "Denied" means access is denied when all of the criteria below is met.
Port	Select the Port identification number (specific port values must have been pre-configured for the server). Choose the 'All' option if the configuration applies to all Ports on the Server.
Service Type	Enter the Service Type that this Port Access definition applies to. Chose the 'All' option if the configuration applies to all Service Types.
Start Time	Enter the Start/Stop time access restrictions for the Server Port entry. Enter the values in 24

Stop Time	hour clock notation (HH:MM).
Max Session Length	Enter the maximum number of minutes that sessions matching this criterion are to be limited.

Press the **Update** button to save the new or modified Server Access entry. To use this feature ' (Auth) Server port access ' must also be enabled within the 'Advanced' menu of RadiusNT/X administrator.

IP Groups

IP Groups are used to define

IP Groups		
IP Group	**Pool Usage**	
spokane	Available: 59 / 59	
seattle	Available: 5 / 5	
new york	Available: 5 / 5	
test	Available: 0 / 0	Delete

RADIUS IP Group
Name: [   ]
Update

sets of reservable IP addresses,
or *IP Pools*. Choosing the **IP Groups** RADIUS Administrative option will present the display of the currently configured IP Groups. Retrieve an existing IP Group entry for view and/or edit by clicking on the desired entry. To remove an IP Group, click the Delete link next on the selected entry. To add a new IP Group, click the **New IP Group** link.

The IP Group entry field is described below. Press the **Update** button to save the new IP Group entry.

Name	Enter an identifying name for the IP Group.

Defining IP Addresses for an IP Group

After creating an IP Group, IP Addresses can be assigned to it. Select an IP Group name from the IP Group list to display all current IP Addresses for that group. To add a new IP Address to the IP Group, click the **New IP Address** link. To add a new IP Range click the **New IP Range** link

IP Addresses			
IP Address	**Last Used**	**Status**	
10.0.8.1	03/18/04 01:46:20	Available	Delete
10.0.8.2	03/18/04 01:46:21	Available	Delete
10.0.8.3	03/18/04 01:46:21	Available	Delete
10.0.8.4	03/18/04 01:46:19	Available	Delete
10.0.8.5	03/18/04 01:46:19	Available	Delete

When defining an IP Address Range the first three octets of the Ipv4 address are entered in the first three fields after the **IP Range** label. The fourth field sets the starting value of the last octet while the fifth and final field sets the ending value of the last octets of the ipv4 addresses to be added.

RADIUS IP Address Range
IP Range: [   ].[   ].[   ].[[   ] - [   ]]
Add Range

RADIUS IP Address
IP Address: [   ]
Update

As an example to create an address range of 10.0.8.1 thru 10.0.8.100 enter the following: "10" "0" "8" "1" "100" in the IP range field.

Note: At this time only Ipv4 addresses are supported for RADIUS based IP pool management.

IP Service Types

IP Service Types define how IP pools
configured above are allocated to clients.
Each IP Service Type associates an IP Pool
with a set of Server Groups and Service
Types.

		IP Service Types				
Server Group	**Service Type**	**Priority**	**IP Group**	**Assignment**		
earth	All	1	All	Per-Session / Dynamic	Delete
new york	All	3	new york	Per-Session / Dynamic	Delete
seattle	All	2	seattle	Per-Session / Dynamic	Delete
spokane	All	1	spokane	Per-User / Static	Delete

IP Service Types	
Server Group: seattle	IP Group: seattle
Service Type: All	Assignment: Per-Session / Dynamic
Priority: 2	
	Update

Choosing the **IP Service Types** RADIUS Administrative
option will present the display of the currently configured IP
Service Types. Retrieve an existing entry for view and/or edit
by clicking on the desired entry. To remove an IP Service
Type, click the Delete link next on the selected entry. To add a
new one, click the **New IP Service Type** link.

Server Group	Emerald RADIUS Server Group for which this IP Service Type definition applies. The Server Group selection is required and will restrict the Servers that users of the optionally chosen Service Type can access.
IP Group	IP Group of IP Addresses allowed access to the selected RADIUS Server Group above.
Service Type	Service Type(s) chosen to access the selected Server Group.
Assignment	Provides control over the terms of an IP allocation. 'Per-Session' assigns an IP address to the authenticating client for the duration of their session. Once the session is closed the IP address is returned to the pool for assignment to a new client. 'Per-User' anchors the IP address to the clients user account so that the user is assigned the same address for all subsequent sessions. The allocation is only returned to the pool when the user account is canceled, inactivated or manually removed from the address pool. 'Per-User' is ideal for providing 'Static IP' services.
Priority	Enter the priority of this entry that will determine the order in which IP Service Types are evaluated and applied by the system. Priorities are numerical values, generally between 1 and 1000.

Press the **Update** button to save the new IP Service Type entry. To use this feature ' (Auth) IP pooling' must also be
enabled within the 'Advanced' menu of RadiusNT/X administrator.

Please note that all Server Groups should be configured within the RADIUS Server Groups menu option prior to
defining any IP Service Types.

Server Types

Server Types are used within RadiusNT/X to
track the type of a server that is supported. This
feature is intended for backwards compatibility
only. You do not need to configure a server type
if your access server(s) do not appear in this list.
Configuring the Server Types is primarily used
for SNMP Concurrency Checking. The
Emerald Management Suite provides a default
Server Type list that will typically be sufficient
for most system configurations. Emerald only
knows how to process these pre-configured

			Server Types			
ID	**Vendor**	**Model**	**SNMP Type**	**SNMP User**		
-2	IEA Software	Emerald Client	Port Number	None		Delete
-1	IEA Software	RadiusNT/X Server	Port Number	None		
0	Generic	Start at 0	Port Number	None		
1	Generic	Start at 1	Port Number	None		Delete
2	Livingston	Portmaster 2	Port Number	.1.3.6.1.4.1.307.3.2.1.1.1.4.		
3	Livingston	Portmaster 3	Port Number	.1.3.6.1.4.1.307.3.2.1.1.1.4.		Delete
4	Livingston	Portmaster 4	Port Number	.1.3.6.1.4.1.307.3.2.1.1.1.4.		Delete
5	Ascend	Max 4000 T1	Session-ID	.1.3.6.1.4.1.529.12.3.1.4.		Delete
6	Ascend	Max 4000 E1	Session-ID	.1.3.6.1.4.1.529.12.3.1.4.		Delete
7	Ascend	MAX 1800 BRI	Session-ID	.1.3.6.1.4.1.529.12.3.1.4.		Delete
8	Ascend	MAX TNT	Session-ID	.1.3.6.1.4.1.529.12.3.1.4.		Delete
9	Cisco	AS5200	Port Number	.1.3.6.1.4.1.9.2.9.2.1.18.		Delete
10	USR	Total Control	Port Number	None		Delete
11	CompuTone	PowerRack	Port Number	None		Delete
12	Microcom	6000	Port Number	None		Delete
13	USR	HyperARC	Port Number	.1.3.6.1.4.1.429.4.10.1.1.18.		Delete
14	Nortel	Nortel 5399	Port Number	.1.3.6.1.4.1.15.2.16.1.2.1.3.1.		Delete

Server Types; therefore, any new Server Types added to the system configuration will not be fully supported.

Choosing the **Server Types** RADIUS Administrative option will present the display of the currently configured Server Types. Retrieve an existing Server Type entry for view and/or edit by clicking on the desired entry. To remove a Server Type, click the Delete link next on the selected entry. To add a new Server Type, click the **New Server Type** link.

The Server Type entry field is described below.

Server Type	Enter a unique numeric identifier for the Server Type.
Vendor	Enter the text information description of the Vendor.
Model	Enter the text information description of the server model.
SNMP Type	Select 'Port Number' or 'Session' to designate the SNMP user type.
SNMP User	Enter the base OID used for SNMP Concurrency checking. It should be a string ending in "." in order to be correctly formatted for the RadiusNT/X user name query. If the SNMP Type is Port, it will append the port number the user is logged onto to the string. If SNMP Type is Session-ID, it will append the user's session ID onto the string.

Press the **Update** button to save the new or modified Server Type entry.

Roam Servers

Emerald Roam Servers are additional RadiusNT/X or other RADIUS compatible servers, typically outside of your system domain, that Emerald can forward requests to. Defining a Roam Server is very similar to adding any other Emerald Server, because Emerald will communicate with it in a similar manner. Coordination with the System Administrator of the Roam Server you are forwarding requests to is required in order to insure the correct RADIUS shared secret is being used.

Choosing the **Roam Servers** RADIUS Administrative option will present the display of the currently configured Roam Servers. Edit an existing Roam Server by clicking on the desired entry. To remove a Roam Server entry, click the Delete link next on the selected entry. To add a new Roam Server, click the **New Roam Server** link. The Roam Server entry fields are described below.

IP Address	Enter the IP Address of the Roam Server.
Server	Enter the name of the Roam Server that Emerald will forward the requests to.

Secret	Enter the RADIUS shared secret of the RADIUS Roam Server. Refer to the RadiusNT/X documentation for more information on RADIUS Secrets.
Timeout	Enter the number of seconds in which forwarded requests will timeout if not acknowledged.
Retries	Enter the number of times that failed forwarded requests should be retried.
Treat as Local	This option indicates whether this server will be receiving requests. Select '**No**' in order to forward requests to the server. Select '**Yes**' to indicate the server is not receiving requests and Emerald should process the requests locally. Note: This is a handy option when defining your own domains so that login attempts from specific domains will be authenticated locally rather than forwarded.
Strip Domain	This option indicates that RadiusNT/X should remove the domain before forwarding the request. The option descriptions are as follows: • **None**: The domain part of the request is not stripped. • **Accounting**: Only strip the domain from the accounting requests. • **Authentication**: Only strip the domain from the authentication requests. • **Both**: Strip the domain from both the authentication and accounting requests. Note: Consult the System Administrator of the Roam Server regarding the format they are expecting to receive.
Auth Port	Enter the port number where RadiusNT/X will forward the Authentication requests to the server. Typically this defaults to 1645, although the System Administrator of the Roam Server may request a different port number.
Acct Port	Enter the port number where RadiusNT/X will forward the Accounting requests to the server. Typically this defaults to 1646.
Target Rate	Target forwarding rate in requests per second. Used for load balancing purposes when there are several roam servers attached to a roam domain. If there is only one roam server available Target Rate is unused.
Max Rate	Maximum forwarding rate in requests per second. Used for load balancing purposes when there are several roam servers attached to a roam domain. If there is only one roam server available Max Rate is unused. Max rate is not enforced when all other proxy servers in a roam domain have also exceeded their forwarding rate.

Press the **Update** button to save the new or modified Roam Server entry.

Proxy Attribute Group

Authentication requests can be proxied based on the value of a group of attribute check items (for example, a user logging in with a special character in his name, or from a specific DNIS number). Configure this by creating a Proxy Attribute Group and associating it with an existing Roam Server and a particular set of check attribute values. Once a Roam Server has been defined, select the Roam Server for edit to define the Proxy Attribute Group.

Retrieve an existing Proxy Attribute Group entry for view and/or edit by clicking on the desired Roam Server and then selecting the entry of the Proxy Attribute Group. To remove a Proxy Attribute Group entry, click the Delete link next to the selected entry. To add a new Proxy Attribute Group entry, click the **New Proxy Attribute Group** link. Note: The delete option for a Proxy Attribute Group will not be show if the group has Proxy Attributes

assigned to it. The Proxy Attribute must be deleted before you can delete the Proxy Attribute Group. he Proxy Attribute Group entry fields are described below.

Priority	This field defines the priority order of the attribute checks RADIUS performs.
Description	This field gives the description of the Proxy Attribute Group selection.

Press the **Update** button to save the new or modified Roam Domain entry.

Proxy Attributes

A Proxy Attribute is a value that Radius will look for to determine where the packet will be proxied. Once a Proxy Attribute Group has been defined, select the Proxy Attribute Group for edit to define the Proxy Attributes.

Retrieve an existing Proxy Attribute entry for view and/or edit by clicking on the desired Proxy Attribute Group and then selecting the entry of the Proxy Attribute. To remove a Proxy Attribute entry, click the Delete link next to the selected entry. To add a new Proxy Attribute entry, click the **New Attribute** link.   e Proxy Attribute entry fields are described below.

Search Type	Matching condition specifying in what way "String" is to be matched.
String	Value being matched
Attribute	Attribute containing the value to be matched

Roam Domains

The Roam Domains RADIUS Administrative option is used to define both the domains that will be forwarded, and the Roam Servers to which each domain will be forwarded. Emerald enforces no restrictions or limits (beyond size) on the format of the domains defined.

Note:

To find out more detailed information about RadiusNT/X Roaming functionality, please refer to the RadiusNT/X documentation.

Choosing the **Roam Domains** RADIUS Administrative option will present the display of the currently configured Roam Domains. Edit an existing Roam Domain by clicking on the desired entry. To remove a Roam Domain entry, click the Delete link next on the selected entry. To add a new Roam Domain, click the **New Roam Domain** link. The Roam Domain entry fields are described below.

Roam Server	Select the appropriate Roam Server from the pick list. Only servers having been added to "Roam Servers" will be presented in the list.
Domain	Enter the domain to be forwarded to the selected Roam Server. Enter the value without the '@' symbol.

Priority	Enter the priority of the server. This is used in the case that there are duplicate entries for a particular Roam Server/Domain combination to allow for the definition of backup servers. Priorities are required to be unique per individual Roam Server/Domain. If a priority is not unique RadiusNT/X will check both servers in random order should the first return an authentication failure.
Attributes	Indicates that RadiusNT/X overrides the set of attributes the authenticating RADIUS server replied with and instead use the default set of RADIUS attributes associated to the selected Service Type. The default and recommended value is "Pass Thru" which does not alter the authentication response as its proxied through RadiusNT/X.

Press the **Update** button to save the new or modified Roam Domain entry.

Rejects

The RADIUS Rejects Administrative option is used to define the sets of RADIUS attribute/value matches that RadiusNT/X will reject immediately, without actually processing the request. For instance, if you want to reject any user calling from a specific phone number, you could add an entry to the RADIUS Rejects list with the Caller-ID attribute and the specific phone number.

RADIUS Rejects			
Vendor	**Attribute**	**Reject**	
RADIUS Standard	User-Name	test	Delete
RADIUS Standard	Ascend-PPP-Address	12345678	Delete
RADIUS Standard	User-Name	blah	Delete

Choosing the RADIUS **Rejects** Administrative option will present the display of the existing RADIUS Reject entries. Edit an existing RADIUS Reject by clicking on the desired entry. To remove a RADIUS Reject entry, click the Delete link next on the selected entry. To add a new RADIUS Reject entry, click the **New RADIUS Reject** link. RADIUS Rejects entry fields are described below.

Vendor	Select the appropriate Vendor from the selection pick list for the desired RADIUS attribute.
Attribute	Select the appropriate Attribute from the selection pick list. Only the attributes for the above selected Vendor will be available in the pick list.
Data	Enter the Value of the attribute that is to be rejected.

Press the **Update** button to save the new or modified RADIUS Reject entry. To use this feature '(Auth) Reject attributes' must also be enabled within the 'Advanced' menu of RadiusNT/X administrator.
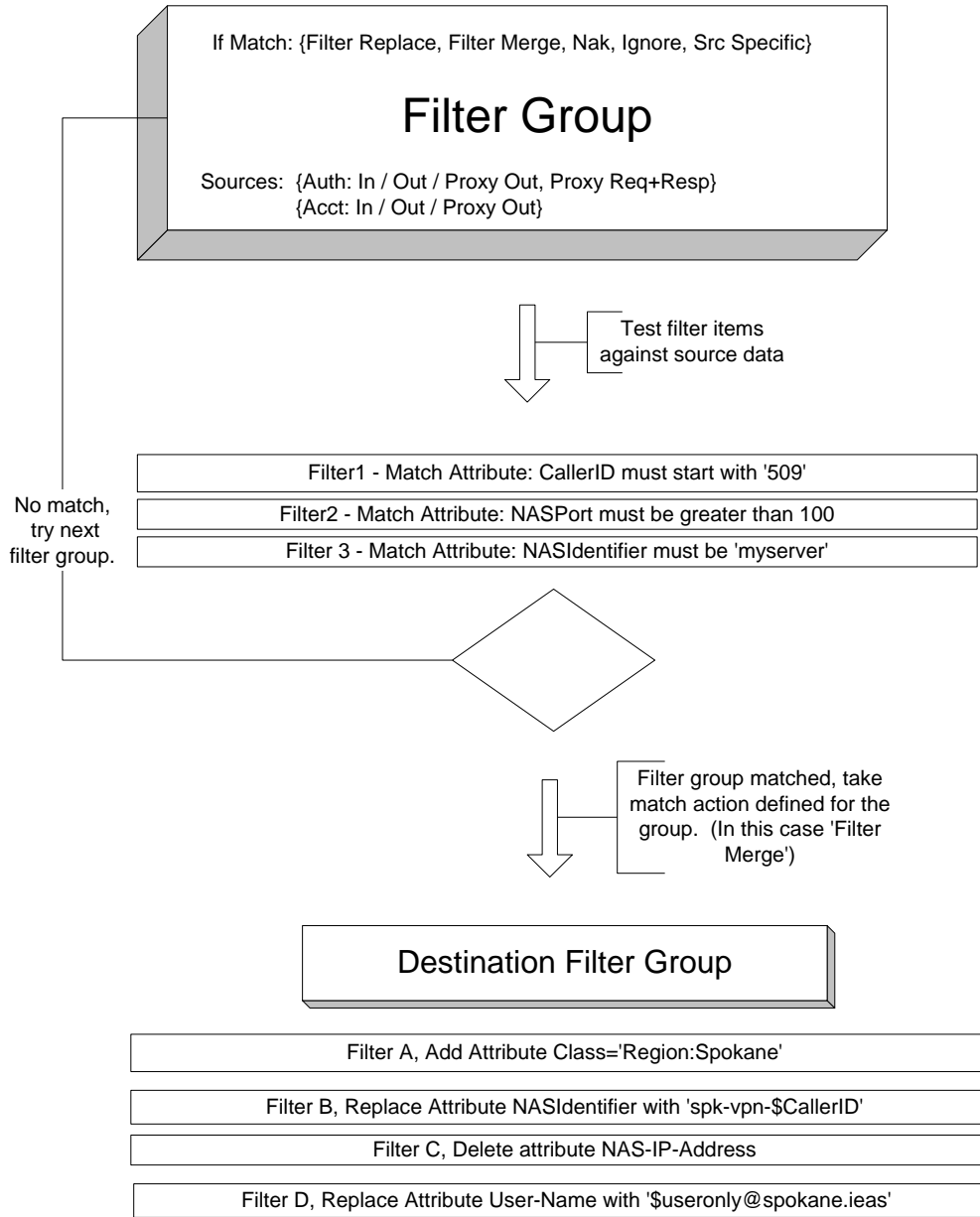
DNIS Groups

The DNIS Groups RADIUS Administrative option is used 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/X.

DNIS Groups			
DNIS Group	**Description**	**Numbers**	
group 1	test	5551212, 5551313, 5551414, 5551616, 5551717,	Delete

DNIS Numbers				
DNIS Number (click to delete)				
5551212	5551313	5551414	5551616	5551717

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 telephone 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/X will not enforce the DNIS restrictions.

Choosing the **DNIS Groups** RADIUS Administrative option will present the display of the existing DNIS Groups. Edit an existing DNIS Group by clicking on the desired entry. To remove a DNIS

Group, click the Delete link next on the selected entry. To add a new DNIS Group entry, click the **New DNIS Group** link. The DNIS Group entry fields are described below.

DNIS Group	Enter an identifying name for the DNIS Group.
Description	Enter a longer DNIS Group description or comment.

Press the **Update** button to save the new or modified DNIS Group entry. To use this feature '(Auth) Enable DNIS Access' must also be enabled within the 'Advanced' menu of RadiusNT/X administrator.

Filter Groups

In some situations to support unique features of various NAS hardware, limit access or enforce policy in roaming environments the RADIUS server may need to add, alter or remove attributes going in, out or passing through the server. RADIUS filtering allows the flexibility to support

Filter Groups					
Filter Group	**Description**	**Filter source**	**Dest type**	**Dest filter group**	**Dest data**
IEA clear invalid session times	A bug in some NAS devices cause invalid Acct-Session-Time values to be sent. This filter resets any Acct-Session-Time attributes containing a session length of more than a year (31,536,000 seconds)	Acct In	Filter Merge	IEA clear invalid session times (Destination)	
IEA remove '0' NAS-Port	If NAS-Port is sent with a value of 0 remove if from the accounting request.	Acct In	Filter Merge	IEA remove '0' NAS-Port (Destination)	
IEA drop interim accounting records	Interim accounting records are not required by Emerald and can increase the servers accounting load. This filter acknowledges receipt of interim updates but does not log these update records to the 'Calls table'.	Acct In	Source Specific		none

many of these situations. The use of filtering should not be taken lightly and must be carefully thought out. Applying too many filter groups can make it very difficult to understand or troubleshoot the outcome of filtering actions.

Filters have two main components. The source filter that seeks to match a criteria and the destination filter that carries out an action once a match has occurred. The diagram below shows this process in more detail.

Note: Execution of attribute filters requires the "Enable attribute filtering" option in the advanced section of the RadiusNT/X administrator be enabled.

If Match: {Filter Replace, Filter Merge, Nak, Ignore, Src Specific}

Filter Group

Sources: {Auth: In / Out / Proxy Out, Proxy Req+Resp}
{Acct: In / Out / Proxy Out}

Test filter items
against source data

Filter1 - Match Attribute: CallerID must start with '509'

Filter2 - Match Attribute: NASPort must be greater than 100

Filter 3 - Match Attribute: NASIdentifier must be 'myserver'

No match,
try next
filter group.

Filter group matched, take
match action defined for the
group. (In this case 'Filter
Merge')

Destination Filter Group

Filter A, Add Attribute Class='Region:Spokane'

Filter B, Replace Attribute NASIdentifier with 'spk-vpn-$CallerID'

Filter C, Delete attribute NAS-IP-Address

Filter D, Replace Attribute User-Name with '$useronly@spokane.ieas'

Source filter group

The source filter group defines what is to be matched "Filter Source" and what happens when a match occurs "Destination filter group" and "Destination type".

Group name	Unique description of this filter group
Description	Text describing in detail the source filter group and what conditions it is designed to match.
Active	When "Yes" this filter group is available to be matched by requests to RadiusNT/X. The "Enable attribute filtering" option in the "Advanced" menu of the RadiusNT/X admin must also be enabled. When "No" this filter group will not be matched.
Filter Source	Represents the source of the data to match and also the data set to modify when processed by the destination filter group.

Option	Description
Disable or Chain Dest	Group can only be used as a destination filter group.
Auth In	Incoming authentication requests before being processed by RadiusNT/X
Auth Out	Outgoing authentication responses after being processed by RadiusNT/X.
Auth Proxy Out	Outgoing proxy authentication REQUESTS after being processed by RadiusNT/X.
Auth Proxy Req+Resp	This is a special case for authentication proxy that uses the authentication request attributes to match the filter group – however the authentication response is actually modified.
Auth Req+Resp	This is a special case for authentication requests that uses the authentication request attributes to match the filter group – however the authentication response is actually modified.
Auth Proxy Resp	Outgoing proxy authentication RESPONSE after being processed by RadiusNT/X.
Acct In	Modifies incoming accounting requests before being processed by RadiusNT/X.

		Destination data sets an alternate local accounting table other than the default "Calls" table
	Acct Out	Reserved for future use.
	Acct Proxy Out	Outgoing proxy accounting REQUESTS after being processed by RadiusNT/X.
Destination filter group	A filter group of type "Disable or Chain Dest" to process should this source filter group be matched.	
Destination type	Determines how or if the destination filter group is to process RADIUS requests should the source filter group match.	

Option	Description
Filter Replace	Removes all source attributes before applying destination filters. Note that certain RADIUS attributes used internally for authentication and state management are normally are excluded from this replacement rule.
Filter Merge	Uses the merge settings of individual destination filters to specify how the source attributes should be modified.
Nak	Sends an authentication NAK to the request optionally sending the "Destination Data" field as the reply-message. If NAK is used with an accounting request – the request is ignored.
Ignore	Drops the request without responding. Ignore is not enforced for proxy sources.
Source Specific	Source specific is used in conjunction with "Destination Data" to specify custom behavior specific to a source. When the 'Acct Out' "Filter Source" is used Destination data becomes the name of an alternate Calls table to log calls. (Different from the default "Calls" table)

Sort Order	Controls the order in which filter groups are searched and processed. Note that multiple filter groups can be matched ('Filter Replace' or 'Filter Merge' destination types) and applied per request.

Source filters

Once a source filter group is defined source filters are associated with the new filter group to define the criteria for

a match of the source filter group. In the example in this image we want to match the source filter group to match only when accounting session duration exceeds a year.

If no source filters are defined the source filter group is executed unconditionally for each request of type "Filter Source".

Search source	Determines what is to be matched.	
	Option	**Description**
	Client IP	IP Address of the RADIUS client initiating the request
	Host IP	IP Address if the RADIUS server
	RADIUS Attribute	RADIUS source attribute. See "Filter Source" above.
	Destination IP	IP Address of RADIUS server the request is being proxied to
Search option	Search type specifies which match operation to use when matching RADIUS attributes. Any other "Search source" uses an exact match.	
	Option	**Description**
	String	Exactly match string
	Substring	Match any portion of a string
	Equal	Exactly match a numeric value
	Less than	Is less than a numeric value
	Greater than	Is greater than a numeric value
	Ends with	Exactly match the ending portion of a string
	Starts with	Exactly match the starting portion of a string
	Any Value	Match any value including null
	Distributed Key	Format is gid:gmax where gid is group number and gmax is the total number of groups. The distributed key provides deterministic load balancing based on the contents of an attribute being matched. It is case insensitive and useful for distributing accounting information to various connection groups based on user-name or server in a way that guarantees all users or servers with the same values are always routed together to the same place.
RADIUS Vendor	When Search source is "Radius Attribute" this reflects the RADIUS Vendor of the attribute to match.	
RADIUS Attribute	When Search source is "Radius Attribute" this reflects the RADIUS Attribute to match.	
Search string		

Destination filter group

The destination filter group defines what action is to be taken after the "Source Filter Group" has been matched.

Group name	Unique description of this destination filter group
Description	Text describing in detail the destination filter group and what changes it has been designed to make.
Active	When "Yes" RadiusNT/X processes this destination filter. When "No" the destination filter is not processed.

Filter Source	For destination filter groups this is always "Destination Group"
Sort Order	Used for ordering of available destination filter groups in destination group selection list.

Destination filters

Once a "Destination Filter Group" is defined destination filters are responsible for carrying out

the changes to RADIUS attributes prescribed for this destination filter. In the example in this image the value of Acct-Session-Time is being changed to zero.

Merge operation	Determines what action is to be performed on the data.
	<table><tr><th>Option</th><th>Description</th></tr><tr><td>Delete</td><td>Delete any source attribute matching the "RADIUS Vendor" and "RADIUS Attribute" fields below.</td></tr><tr><td>Delete matching</td><td>Delete any source attribute matching the "RADIUS Vendor" and "RADIUS Attribute" fields also having a value of "Matching Data" below.</td></tr><tr><td>Add</td><td>Adds a new RADIUS attribute of type "RADIUS Vendor" and "RADIUS Attribute" containing the value "New Data"</td></tr><tr><td>Replace value</td><td>For every RADIUS attribute matching "RADIUS Vendor" and "RADIUS Attribute" replaces its current value with the contents of the "Replace Data" field.</td></tr><tr><td>Add or replace value</td><td>Similar to Replace value above except that if no attributes match the attribute containing the new value is added.</td></tr><tr><td>Add attributes from query</td><td>When selected the "SQL Query" field specifies a database query to retrieve attributes from the authentication database and adding them to the response. The result set returned by this query must contain the following three columns "AttributeID", "VendorID", and "Data". If this query fails for any reason the authentication request is rejected.</td></tr><tr><td>Log query for accounting</td><td>Similar to Add attributes from query except no result set is expected and the query is queued for execution into the accounting spooler. If the accounting queue is full the filter operation fails. If the query fails to execute the associated error is sent to the accounting log.</td></tr></table>
Match option	Used with "Delete matching" merge operation to determine the search operation used to match the attribute for deletion.
RADIUS Vendor	Used with all Merge operations except "Add attributes from query" and "Log query for accounting".
RADIUS Attribute	Used with all Merge operations except "Add attributes from query" and "Log query for

	accounting".
Replace Data	Used with "Replace value" and "Add or replace value" merge operations.
New Data	Used with "Add" merge operation.
Matching Data	Used with "Delete matching" merge operation.
Connection Group	Used with "Add attributes from query" and "Log query for accounting" merge operations to specify an alternate group of ODBC connections for query execution. By default when no connection group is specified the Authentication data source is used for "Add attributes from query" and Accounting data source for "Log query for accounting" any connection groups specified must be configured in the "ODBC Connection Groups" section of the RadiusNT/X administrator. If a named connection group is not defined the query operation fails.
SQL Query	Used with "Add attributes from query" and "Log query for accounting" merge operations.

In a destination filter the Data and SQL Query fields can contain variables used for setting and replacing data. All RADIUS attributes are available as variables by entering $attributename without any hyphens defined in the standard RADIUS attribute names. For example $UserName contains the contents of the RADIUS User-Name attribute. This can be used to add extra data such as a realm to the start or end of the User-Name attribute as it passes through RadiusNT/X. For SQL fields adding the ' character after $ … $'UserName instructs RadiusNT/X to handle the contents of the attribute as if it were a string quoting its contents and properly escaping data such as the single quote. In addition to RADIUS attributes the following special variable is available: $useronly contains the realm stripped version of the RADIUS User-Name attribute.

Group Concurrency

Concurrency control is widely used on a per account basis to restrict the number of concurrent sessions any single account is

Group Concurrency					
Last Sync	Group	Service Type	Connections	Description	
10/13/06 22:36:55	ISPs	ISDN	0 out of 100	Limit ISDN channel usage	Delete

allowed to have. This serves to prevent abuse by discouraging sharing of the access account with others. Group concurrency takes the same idea of restricting concurrent access but applies it at the service type and billing group level. This is useful for cases where for example a billing group belongs to a company that may not be allowed to use more than a set number of concurrent sessions at any one time.

If group concurrency is in use both the users per account concurrent session limit and the group concurrency limit apply. Note in order for concurrency control to be enforceable the "Concurrency control" option in the "Advanced" menu of the RadiusNT/X administrator must first be enabled.

Enforcement and accuracy of concurrency control depends on complete and timely receipt of accounting records from all access devices. If you are using an outsourced provider for network access please check with them to ensure they offer a robust RADIUS accounting retry policy.

Group Concurrency	
Billing Group:	ISPs
Service Type:	ISDN
Max Connections:	100
Description:	Limit ISDN channel usage
	Update

Billing Group	Billing group the concurrency restriction is to apply.
Service Type	Optional service type the concurrency restriction is to apply. If "All" the concurrency restriction applies to all accounts within the billing group.

Max Connections	Maximum number of allowed concurrent sessions
Description	Text uniquely describing the purpose of the group concurrency restriction.

If multiple overlapping group concurrency restrictions apply to a single subset of accounts the most restrictive setting is honored.

Clear Online List

When selected the current listing of active sessions as shown via the "Client" / "Reports" / "Online" menu is cleared regardless of the status of any individual sessions. Clearing this list has no effect on active sessions. When this is done the online list may become out of sync with any currently active sessions until all active sessions have been reset. The online list is also used for concurrency enforcement. It is recommended the online list be cleared whenever RadiusNT/X has been offline for an extended period of time due to a network or database outage or when there is reason to suspect a substantial number of RADIUS accounting stop records have been lost. Clearing the online list should not be done when rebooting a network access server as long as it sends Accounting-On and or Accounting-Off notifications on reboot Emerald will automatically clear any effected sessions.

Auth Test Config

This menu option sets the optional RADIUS request attributes sent when testing RADIUS authentication for accounts via the "Client" / "Service" / "RADIUS" / "Auth Test" menu.

Session Manager

The session manager continually monitors active RADIUS sessions as shown in Emeralds online list report for violations of defined access limits and issues a change of authorization or disconnect for sessions which have exceeded them.

In many environments the session manager may not be necessary as sufficient limits are enforced by RADIUS reply attributes such as Acct-Session-Time' to limit the time a session can remain active in addition to features such as concurrency control preventing the same account from establishing multiple sessions at the same time.

To use the session manager on the windows platform the "Emerald Session Manger" service must be started and configured to start automatically via the windows services manager. On UNIX platforms the /usr/local/emerald/sesmgr program should be started. Running "sesmgr –debug" from the folder Emerald has been installed to will start the session manager in debug mode allowing you to view detailed information on any actions taken by the session manager. Session manager can be run in simulated mode where rather than disconnecting sessions the actions it would normally take are displayed on screen by including the flag '-disarm' when running the sesmgr manually.

All access servers receiving disconnect requests must support RFC3576 disconnect messages and be configured to allow disconnect requests from the Emerald server running the session manager. Additionally each access server and its CoA/Disconnect port must be configured in Emerald via the "Admin" / "RADIUS" / "Server Groups" menu.

The following are situations where the session manager is useful for managing session limits:

- Enforcement of session time and data restrictions (Time Left and Data Left fields in the MBR services menu) when concurrency control is not enforced or where accounts are otherwise allowed to have multiple sessions active at the same time.

- Enforcement of data and rating/account balance based restrictions such as monthly total data usage limits. In order to disconnect active sessions after a set amount of data usage has been reached it's important the access server is configured to send RADIUS Accounting Interim update records to RadiusNT/X on a regular basis. See "Admin" / "Rating" / "Rule Sets" for more information on configuring data usage restrictions.

- Session manager provides an alternate method of concurrent access control. Typically concurrent access is controlled during authentication. RadiusNT/X checks the list of online users and if the user already on that list they are not allowed access. This method may incorrectly deny access by determining a user is already online when they are not due to delay in receipt or loss of RADIUS accounting messages. The session manager approach to concurrency enforcement does not suffer from this problem. The session manager allows the authentication to proceed and if there is a concurrency violation the oldest active session is disconnected.

Enforce Concurrency Control	When enabled the session manager enforces account login limit restrictions. If the number of allowed concurrent sessions is exceeded the oldest existing session is disconnected. Only per account concurrency restrictions are enforced. Group based concurrency control is not.
Enforce Time Left	When enabled the session manager enforces account time left restrictions
Enforce Bytes Left	When enabled the session manager enforces account data left restrictions
Enforce Rate/Balance Restrictions	When enabled the session manager disconnects sessions by checking the usage of all open sessions for the account against the configured rating rules. If there is no time remaining or an authentication reject rule applies (See rating upload attributes in the "Rating" section of this document) the session is disconnected. If change of rating authorization parameters via upload attributes is detected a change of authorization (CoA) message will be sent with new authorization parameters. If the CoA request is not successful a session disconnect is then issued.
Debug Options	When running in the background as a windows service or detached process on UNIX systems the debug options control the amount of detail about the activities of the session manager to the session manager log file by default sesmgr.log located in the log sub directory of the emerald folder. Normally all debug options are disabled. Any error or warning conditions that occur are unconditionally written to the sesmgr.log file.
Limit Check Interval	Number of seconds between checks of all active sessions for time left or concurrency violations. This must not be set lower than 20 seconds.
Rating Check Interval	Number of seconds between checks of all active sessions for rating rule violations (See Enforce Rate/Balance Restrictions above) This must not be set lower than 20 seconds.
Rating global history preload	If Rating/Balance restrictions are enforced and rating rules require access to historical summary data to account for usage this controls weather the information is retrieved per account "No" or globally "Yes" as necessary. Enabling this option may improve performance of the Emerald system at the expense of possibly slightly outdated summary data. The default recommended value is "No".

Scheduler

At the core of the Emerald Management Suite is the Scheduler component which provides for billing tasks, as well as other system activities, to be scheduled to automatically occur at specified times or time intervals throughout the day. The billing process can be set up to run within the Scheduler at user-configured intervals so that the entire process is handled automatically by the system without the need for any Emerald operator intervention or maintenance. Due to its reliability and efficiency, using the Emerald Scheduler is the recommended procedure for performing most billing activities.

Any number of Emerald *Schedule Servers* can be configured and running at one time, allowing the scheduled task workload to be distributed over a number of servers. Tasks that are available for Emerald scheduling must be pre-defined and registered locally on each Schedule Server in which they will be scheduled to run on. Schedule Servers are locally configured within a separate Scheduler Configuration Administrator interface usually performed during system installation. Please refer to the Emerald Configuration Administrators documentation under Scheduler Configuration for more information on task and Scheduler configuration.

All pre-configured automated Emerald tasks are scheduled and monitored within the **Scheduler** Emerald Administrative options, described below.

Search Task History

The **Search Task History** Scheduler Administrative option provides the ability to search and verify the status of current and past scheduled tasks.

When selected, the user is prompted for the following search criteria:

Starting	Enter the date (in any valid date/time format) to search from. All tasks scheduled on or after the given date will be presented and displayed. The default is today's date.
Status	Enter the Status of the tasks to be displayed. Choose 'All' to get a list of all tasks, regardless of status.
Task Type	Enter the Type of the tasks to be displayed. Choose 'All' to get a list of all tasks, regardless of type.
Description	Enter the Description of the task to be searched for. The Description search is non-case sensitive and will perform a partial text search (for example, entering 'Clear' will return all task entries with a description that contains the word 'Clear').

Press the **Search** button to initiate the task search. When complete, a task list containing the tasks

that meet the search criteria will be presented in the display window. The tasks will be presented with their task ID, description, current or final status, the date the task was started and completed.

Current Status

The **Current Status** Scheduler Administrative option provides the ability to view the status of all currently running Scheduler tasks. When selected, the user will be presented with a list of all currently running tasks describing the Server the task is running on, the task description, current status and when the task was started.

Running Tasks			
Server	Task	Status	Start Date
⚠ No tasks currently running			

Configure Schedules

The **Configure Schedules** Administrative option provides the ability to configure and manage the Scheduler task list. When selected, the list of all scheduled tasks will be presented. Edit an existing scheduled task by clicking on the desired entry. To remove a scheduled task, click the Delete link next on the selected entry. To schedule a new task, click the **Add** link.

ID	Task Name	Description	Active	Aligned	Interval	Start	Server	Options
307	batchexport		Yes	No	Run Once		Auto Assign	Delete
163	Query	Update MBR billing day	Yes	Yes	Daily	01/01/00 01:55	Auto Assign	Delete
162	query	Merak Mail Sync (daily)	No	Yes	Daily	01/01/04	Auto Assign	Delete
161	query	Merak Mail Sync (partial)	No	Yes	5 Minutes	01/01/04	Auto Assign	Delete
153	Query	Update Payment History	Yes	Yes	Daily		Auto Assign	Delete
151	query	Incidents incremental FTS reindex	No	Yes	1/4 Day	01/01/00	Auto Assign	Delete
116	query	Update Server History	No	Yes	1 Hour	01/01/00 02:40	Auto Assign	Delete
115	query	Update Server History	No	Yes	30 Minutes	01/01/00	Auto Assign	Delete
114	Query	Inactivate Canceled Accounts	Yes	Yes	Daily	01/01/00 00:45	Auto Assign	Delete

Tasks must be predefined before they can be scheduled to run. A default set of schedulable billing Tasks are provided as part of the Emerald installation package. The Emerald Enterprise version offers a Scheduler **Tasks** option that will allow you to define and configure new tasks that can be run within the scheduler. Contact the IEA Software Customer Support department for more information on creating custom scheduler tasks.

Note:

One-time tasks will be automatically removed from the Task list once the task has been completed and/or expired.

The Schedule Task entry fields are described below. Press the **Save** button to save the Scheduled Task entry.

Task Type	Select the task type from the task list. Only the tasks predefined by the Emerald Administrator within the Scheduler Tasks option will be presented in the pick list.
Schedule Server	Select the Schedule Server on which the selected task is to run. Choosing the 'Auto Assign' option will allow the Scheduler to make the appropriate decision based on current Schedule Server workload.
Parameter	If the task is configured to accept parameters qualifying the task action, enter the value for the parameter here. Common parameter descriptions are provided below: • System/Shell commands – the parameter is the command or script to run • Database query – the parameter is the SQL command • Summary – the parameter specifies which data to consolidate (1 = RADIUS) • User Export – the parameter specifies the External System ID
Description	Optionally enter a description of the scheduled task.
Run Interval	Choose the appropriate interval in which to run the task. The task can be set to run once, or at a set reoccurring interval, based either upon the set Start Date of the task, or the time of the last scheduled run.
Interval based on	Select 'Last Run Date' to align the reoccurring interval each time with the time the task was last run. Or, select 'Start Date' to align the reoccurring interval with the time the task was initially scheduled to run. The 'Last Run Date' allows staggered task run times that force the task to finish before it is rescheduled to run again.
Start Date	Enter the Start date and time of the task. The start date should be entered in "mm/dd/yy hh:ss" format. If time is left off the date/time field value, 12:00 AM (midnight) is assumed.
Target Run-Time	Enter the length of time the task should run. This value can be used to extend the run time of a task to lessen the load on the server
Max Concurrent	Enter the maximum number of instances of this task that can be running at any one time.
Maximum Run-Time	Enter the maximum length of time (in minutes) that this task should run in one session.

Quick Tip:

Other applications, OS system commands, and/or batch processes can be configured to run on an automated schedule by creating a "shell" task type and providing the specific command string (including the file directory path) as the parameter value.

Security

The Emerald Management Suite relies on several layers of system security, enforcing security restrictions at the application level as well as relying on the security model of the back-end database server. The basic security layout is based on the definition of Emerald Operators that are assigned to specific Operator Groups having specific access/privilege levels that are enforced throughout the application. Emerald allows Operator Group access and privileges to be defined down to the Emerald object (invoices, statements, incidents, etc.) and MBR Billing Group levels, allowing strict control over what type, as well as what MBR groups, of information each Emerald Operator has access to.

The first step in implementing the Emerald security model is to define the Emerald Operator Groups and provide their access and privilege levels.

Operator Groups

Operator Groups are used to define a collection of Operators that all have the same access privileges. The Emerald Management Suite provides a default set of Operator Groups that can be modified and/or expanded upon (shown within the screen shot to the right).

Group	Description	IP Security		
Accounting	Accounting Operators	0	Add	
Admin	No Security Checking	0	Add	
CustomerAccess	Customer Account Center	0	Add	
CustomerSignup	Customer Signup Server	0	Add	
Supervisor	Full Client Access	0	Add	Delete
Tech	Tech Support Operators	0	Add	

Quick Tip:

> Operator Groups can be used to define Reseller groups that only have access and reporting rights to specific MBR Billing Groups. Create a new Operator Group for each supported Reseller.

Choosing the **Operator Groups** Security Administrative option will present the display of the existing Emerald Operator Groups. Edit an existing Operator Group and view it's current access privileges by clicking on the desired entry. To remove an Operator Group, click the Delete link next on the selected entry (default Emerald Operator Groups cannot be removed). To add a new Operator Group entry, click the **New Operator Group** link.

The Emerald Operator Group entry fields are described below.

Operator Group	Enter an identifying descriptive name for the Operator Group. This value will be presented within the Operator Group selection pick lists throughout Emerald.
Description	Enter a longer description or comment regarding the Operator Group entry.

Press the **Update** button to save the new or modified Operator Group entry.

Quick Tip:

> A summary of the Operator Group's IP Security configuration, used to restrict Emerald group access to a specific set of IP Addresses, is presented in the Operator Group display. Click on the **Add** link under the Security column to directly access the group's IP Security configuration window

Defining Operator Group Access/Privileges

Once an Operator Group has been created, system and Emerald object-level access privileges can be defined for the group. Select and click on an Operator Group from the Operator Group list to display the current privileges configured for that group.

Each Operator Group Access entry can be individually changed and updated. Once the **Access** field has been modified to the appropriate access privilege value (the access options are described below), and press the **Update** button on the entry row to save the change.

Additional Operator Group Access entries can be added at any time, perhaps to further refine the Operator

Group access permissions, or specify Billing Group restrictions on some sections of Emerald data. To add a new Group Access entry, click the **New Operator Group Access Entry** link. The Operator Group Access entry fields are described below.

Operator Group	Set of operators the new group access permission is to be applied.
Object Group	Identifies areas within the system the operator group is to be granted or revoked access. For a complete list of all available object groups with a description of their use select the "Object Group Info" link from "Admin" / "Security". If you will be doing a lot of security management you may want to print this information out to keep as a reference guide. Object groups are managed from the "Admin" / "Advanced" / "Object Groups" menu.
Billing Group	When billing group is "Global" the access permission applies to all billing groups throughout Emerald. Otherwise the access permission applies only to MBRs and services within the matching billing group. Reseller operators will typically be assigned access only to specific billing groups allowing them to manage only their subset of accounts. Note: Several object groups provide access to information unrelated to the concept of billing groups such as the "Admin" object groups. For these items assigning a specific billing group provides no limits on the use of the data in that area. With the object group descriptions provided by the "Object Group Info" menu option in "Admin" / "Security" is a classification of object groups as "global access" or "group level". "Global access" means there are no group restrictions possible for that object group. Operator Groups assigned "Global access" object groups have full access to all data in that area regardless of weather a specific billing group is set to restrict data access. Object Groups with "group level" respect any defined billing group restrictions defined.
Access	Select the appropriate pre-configured access privilege to apply to the Object Group/Billing Group information for members of this Operator Group. Access specifications range from:

	• **All**: No access restrictions • **Read**: Read access only • **Add**: Allows record additions • **Changes**: Allows record modification • **Delete**: Allows record deletion • **A Pre-configured combination**

Press the **Add Operator Group Access** button to save the new or modified Operator Group entry.

When Group Access is initially being configured for a new Operator Group, or for an Operator Group that has no established Group Access entries, the Administrator will be provided the option to copy the Group Access configuration of another existing Group. To establish the same initial group permissions as another Operator Group, select the group from the selection pick list and press the **Copy** button. To establish the Group Access permissions from scratch, press the **New Operator Group Access Entry** link to navigate to the access entry screen to enter them individually.

Operators

Before an Emerald user can login to the Emerald Management Suite, they must have an Emerald Operator account created within the system.

Choosing the **Operators** Security Administrative option will present the display of the existing Emerald Operator entries. Edit an existing Operator by clicking on the desired entry. To remove an Operator, click the Delete link next on the selected entry. To add a new Operator Group entry, click the **New Operator** link.

The Emerald Operator entry fields are described below.

Operator	Enter an identifying login name for the Operator. This value will be presented as identification within the Operator selection pick-lists throughout Emerald and will also be the audit value recorded to associate most system additions, deletions and modifications to the Operator who performed them.
Password	Enter the Operator's password for Emerald system login. The content of the operator password field is never visible regardless of the systems password visibility rules. If Emerald database

	field encryption is disabled the operators password is stored in the clear in the Operators table.
Group	Select the Operator Group appropriate for this Operator. The Operator will inherit all access privileges from the selected Operator Group.
Email	Enter the full email address of the Emerald Operator. The email address field is informational also used for email notification of incident status.
Language	Sets language of the Emerald client operator interface. The recommended setting of "Auto detect" uses the operators web browser's language settings to determine the appropriate language to display.
Theme	The operators preferred theme. When a non-default theme is selected one million is added to the theme score of that theme. This makes it very likely the operators selected theme will actually be presented when the operator logs on however this can be overridden by matching other criteria for themes having theme scores exceeding one million. (See "Admin" / "Web Interface" / "Themes")
Date Format	The operators preferred date format for rendering of date fields.
Date Separator	The operators preferred character for separating elements (year, month and day) of the date field.
Country	This should reflect the country the operator and most of the operator's accounts are located. The current use of country is to define the local calling area for Caller-ID based account searches.
Print Format	Default print format for displaying the contents of reports. Note the selected print format may be substituted automatically based on the capabilities of enabled report renders.
Active	When "Yes" the operator is able to access Emerald. When "No" the operators account may not be used to access Emerald.

Press the **Add Operator** button to save the new entry, or the **Update Operator** button to save a modified Operator entry.

Group Rights

Various accounting and data display rules are configurable from the group rights menu on a global and per "Operator Group" basis.

Note: Due to special considerations of the built-in "Admin" group where security checking is disabled; group right options for the "Admin" "Global Group" inherit "Global Settings". "Admin" specific "Global Group" configuration is ignored and must not be configured.

Global Group	Controls the operator group the settings apply to. Settings of specific Operator Groups override "Global Settings". Operator groups having configurations separate from the global group display the "*" character by their name.
CSRF Countermeasures	Enables or disables cross-site request forgery (CSRF) protections. When countermeasures are enabled efforts are made to prevent this class of attacks however in doing so it may also prevent linking to specific areas of Emerald from external sites or emails that are not harmful. The following URL links are provided for safely linking to specific areas of Emerald from remote sites. <table><tr><td>**Link**</td><td>**Description**</td></tr><tr><td>mbr.ews?CustomerID=x</td><td>Given an Emerald CustomerID this link displays a specific Emerald MBR.</td></tr><tr><td>sa.ews?AccountID=x</td><td>Given an MBRs AccountID this link displays a specific Emerald MBR Service.</td></tr><tr><td>pkg.ews?PackageID=x</td><td>Given an MBRs PackageID this link displays a specific Emerald MBR package.</td></tr><tr><td>incident.ews?IncidentID=x</td><td>Given an Emerald IncidentID this link displays the details of a specific Incident.</td></tr><tr><td>inv.ews?InvoiceID=x</td><td>Given an Emerald InvoiceID this link displays the details of a specific Invoice.</td></tr><tr><td>stmt.ews?StatementID=x</td><td>Given an Emerald StatementID this link displays the details of a specific Statement.</td></tr></table> The best protection against this type of attack come from always using SSL and configuring appropriate internal security zones in your browser to warn of any unwanted external references to your organizations internal web based applications.
Operator Password Checking	As operators login to Emerald this setting control whether their password should be validated using a case sensitive or case insensitive match.
Password visibility	Determines visibility for client MBR and Service passwords. When "Show Passwords" is set - clear text passwords are visible. When "Hide Passwords" is set a series of "*" characters is displayed in lieu of the password.
CC/EFT visibility	Determines visibility for client MBR and Service secure data fields such as Credit

	Card Number, SSN and bank account numbers. When "Show Secure Data" is chosen this information is displayed in clear text. When "Hide Secure Data" is chosen the information is not displayed and when "Show Only Last 4 Characters" is selected only the last four characters of the secure data field are visible.
Theme Selection	Controls weather the operator's client options menu displays a listing of available themes for the operator to choose from. If disabled only global administrators are able to configure the operators chosen theme.
Language Selection	Controls weather the operator's client options menu displays a listing of available languages for the operator to choose from. If disabled only global administrators are able to configure the operators chosen language.
Search Incident Assignment	When searching incidents from the client support menu this menu option controls the search of incidents assigned to specific operators. Self Only – Operator can search incidents assigned to or created by themselves Operators /w Common Roles – Operators can search incidents assigned to other operators sharing a common role (Emerald Admin / Incidents / Operator Roles) All operators – Operators can search incidents assigned to any operator. Note: These settings effect only the list of operators present in the assignment list when searching incidents. Access to incidents is governed exclusively by the operators assigned operator group.
Allowed Pay Methods	Reflects pay methods operators are allowed to make against the MBRs they manage.
Cash Amount Limit	Reflects the maximum single cash payment amount operators are allowed to make against MBRs they manage.
Check Amount Limit	Reflects the maximum single check payment amount operators are allowed to make against MBRs they manage.
Manual CC Amount Limit	When creating a manual credit card payment this sets the maximum single payment amount the operator is allowed.
Manual ACH Amount Limit	When creating a manual EFT payment this sets the maximum single payment amount the operator is allowed.
Minimum CC Amount	When creating a manual credit card payment this sets the minimum single payment amount the operator is allowed.
Minimum EFT Amount	When creating a manual EFT payment this sets the minimum single payment amount the operator is allowed.

IP Security

Operator login and system access to the Emerald Management System can also be restricted to a specific list of IP Addresses. IP address restrictions are defined per Operator Group. Once one IP Address is specified for an Operator Group, all group access of the system will be restricted to the defined list of IP Addresses for the group.

Choosing the **IP Security** Administrative option will present the display of the existing Emerald IP Security entries for each

Emerald Operator Group. Edit an existing, or add a new, IP Security configuration by clicking on the Operator Group entry. The Emerald IP Security entry fields are described below.

Note: Enforcement of IP Security requires the "Enable IP access security" option to be enabled in the security section of the Emerald configuration server. (/settings URL)

Operator Group	Operator Group to assign the IP address below used to permit access from this address.
IP Address	IP Address can reference a DNS hostname (user.mycompany.com), valid IPv4/IPv6 network in CIDR notation (10.0.8.0/24, fe80::/16) or an address range (10.0.8.1-10.0.8.100) Once an IP Address has been defined, all Emerald access by this Operator Group will be restricted to the defined IP Addresses. Default ('*') enables access to Emerald from any IP Address.
Description	Enter the description of the IP Address entry such as the person or network associated with the network.

Press the **Add** button to save the new entry, or the **Edit** button to save a modified IP Security entry.

Encryption

Using encryption passwords and other sensitive information such as customer credit card and account numbers can be stored within the Emerald database in an encrypted form. Encrypted storage provides two main advantages:

- Sensitive information not useable should database server be stolen or compromised.
- Sensitive information is encrypted when passing between applications (Emerald, RadiusNT/X, scheduler, etc) and the database server.

Encrypted passwords add the following limitations:

- If password encryption is enabled external systems which access the database directly for password information will fail because they are not able to decrypt account password information. Along the same lines any reporting using an external render such as crystal reports will not be able to display the contents of encrypted fields. Password encryption is however fully supported with EmerAuth, RadiusNT/X and the EmerLDAP synchronization server.

Some modern RDBMS support encrypted data both on disk and over network transports in a way that is transparent to applications. These database server encryption features can be used in conjunction or in lieu of Emerald field encryption. Additionally the use of encrypted transport technologies such as IPSec can help to add additional security to your network.

Emerald encryption is based on the AES Rijndael algorithm using a passphrase as the secret key. Each data field is block chained but has no unique initializing data of their own meaning two fields encoded with the same value and secret key always have identical encrypted values. Emerald has the ability to detect most malformed and invalid fields as well as simultaneously supporting encrypted and unencrypted data fields.

Once the Emerald database is encrypted it can be decrypted later with knowledge of the secret key used to encrypt the database. This allows changing of the secret key or decrypting the database for purposes such as exporting data.

It is important to note that secure storage of the secret encryption passphrase is imperative. IEA Software has no way to recover any data encrypted with a forgotten secret key.

To encrypt or decrypt your database click the "Admin" / "Security" / "Encryption" link and follow all instructions and warnings displayed. This process was designed to be done while the system is online with the minimum amount of downtime.

Web Interface

The Emerald Management Suite is based on a web interface that is fully configurable, allowing the Emerald Administrator to customize the appearance, performance and default options of the system. The Web Configuration options are used to perform these configuration tasks.

Admin Web Menu				
Active Sessions	Themes	Signup Servers	Web Links	Client Settings
Operator Limits	Operator Settings	Customer Settings	License Keys	Languages

Active Sessions

All operators and customers currently logged into emerald are visible from the Active sessions link. Clicking the Operator field allows editing of the configuration of that operator and clicking the Last Access field disconnects an active operator forcing the operator to re-authenticate.

Active Operator Sessions

Operator	Group	MBR Global	Last Access	IP Address	Start Page	Theme
admin	Global Administrator	Yes	10/03/06 02:16:39 (0 secs)	127.0.0.1	main.ews	home
admin	Global Administrator	Yes	10/03/06 01:09:13 (1 hrs, 7 mins, 26 secs)	127.0.0.1	main.ews	home

Active User Sessions

Customer ID	Login	Last Access	IP Address	Start Page	Theme
⚠ No Users currently online					

Web Links

Choosing the **Web Links** Administrative option will display the web and file links accessible from the Emerald Management Suite Home Page for Emerald Operators, or from the Emerald Remote Access component for external customer access and query. Edit an existing Web Link by clicking on the desired entry. To remove a Web Link, click the Delete link next on the selected entry. To add a new Web Link entry, click the '**New Web Link'** link.

Web Links

Type	Title	URL	
Operator	IEA Software	http://www.iea-software.com	Delete
Operator	IEA Online Documentation	http://www.iea-software.com/docs	Delete
Operator	IEA Knowledge Base	http://www.iea-software.com/kb	Delete

Web Link

Link Type: Operator
Title: IEA Online Documentation
URL: http://www.iea-software.com/docs
Sort Order: 2
Update

The Emerald Web Link entry fields are described below.

Link Type	Choose '**Operator**' if the web link is to show and be available on the Emerald Client home page for Emerald Operators. Choose '**Customer**' if the web link is to show on the Emerald Remote Access component for online customer queries.
Title	Title of the web link for the home page display.
URL	Enter the URL or full network file path of the link file.
Sort Order	Relative order of link in relation to other web links.

Press the **Update** button to save the new or modified Web Link entry.

Themes

The ability to customize the Emerald interface has several important benefits. Resellers can tailor Emerald to more closely match an existing web site or include company logos and designs. Hotspot operators can have the appearance of a unique presence in multiple venues without separate hardware or software. Layouts designed for devices such as PDAs and cell phones open new possibilities for operator management and services.

Technically themes are based on two technologies: Cascading Style Sheets (CSS) and a theme folder inheritance system unique to Emerald. Working together themes can range from changing colors or logos to designing a completely new look and feel.   References for CSS are available from W3C http://www.w3.org/Style/CSS/ and the folder inheritance system is described in detail below.

For each web request to Emerald information such as Operator, client IP address, host header, time, browser type and others are examined and scored based on the rules configured for each theme. After all rules are examined the theme having the highest score is used in rendering the web interface.

Themes				
Theme	**Filter**	**Match Type**	**Data**	**Score**
iea	Peters test theme			
	Emercust domain match	Host Header / Domain	test.iea-software.com	1000
home	This is theme is set when operators connect from their home office			
	Home	Client Internet IP Address	10.0.3.*	100000
	This is home too while testing the signup server	Client Internet IP Address	10.0.0.*	1000000

Note additional rules not displayed in the themes menu may play a part in theme selection such as the operator selection of a specific theme.

New Theme	
Theme	
Description	
	Update

Theme	Short theme name that is also the subdirectory name of the Emerald theme folder located on the Emerald server where files specific to this theme are located.
Description	Text showing the purpose and any useful notes for this theme. The Description field is informational and only displayed here.

Theme Filters

Scores are awarded to themes having "theme filters" which match a set criterion. Each matching theme filter adds its Score value to that themes total. The theme with the highest score is used.

Theme Filters				
Filter	**Match Type**	**Data**	**Score**	
Home	Client Internet IP Address	10.0.3.*	100000	Delete
This is home too while testing the signup server	Client Internet IP Address	10.0.0.*	1000000	Delete

Edit Match Filter

Filter Description	Home
Match Type	Client Internet IP Address
Data	10.0.3.*
Score	100000
Comments	

Update

Filter Description	Text describing the purpose of the filter
Match Type	Reflects the source and type of data being matched. The following match types are currently available: • **Host Header / Domain**: Matches the virtual domain HTTP_HOST header sent by the browser. • **Browser & Client OS type**: Matches browser and operating system type. The following keywords are available to be matched: "Linux", "Windows CE" , "Windows", "Mac", "Macintosh", "Smartphone", "Opera", "IE6", "firefox", "IE5", "netscape", "mozilla", "IE" and "Lynx" • **Client IP Address**: The following client address formats are matched: x.x.x.x, x.x.x.*, x.*.* and x.*.*.* • **Time or Day**: Reserved for future use
Data	Value to match – see "Match Type" above for more information.
Score	Relative theme score to add to the themes total when "Data" matches the "Match Type" condition.
Comments	Additional information related to the use of this filter.

Theme Folders

All themes related information is stored on disk on the Emerald server in the web\themes subdirectory where Emerald has been installed. The default theme included with Emerald is located in the "default" subfolder. Other user-created themes are located in the subdirectory that corresponds to the name of that theme. Any requested files from a subdirectory other than "default" are first looked for in that subdirectory. If the file does not exist Emerald automatically looks for the same file in the "default" folder. This allows for the creation of new themes with minimal changes from the default theme without having to 'copy' all files from the default folder into each theme folder. This approach has the added advantage in that themes will continue to work in the face of new features and updates to the Emerald software.

When creating new themes copy only those files you will be changing. **Never make changes to files within the "default" theme** as any changes will be overwritten by future Emerald updates. Additionally IEA produced or IEA reviewed third party themes may depend on facets of the default theme.

Never accept themes from third parties you don't trust and never allow a non-trusted operator or customer to places files in the themes folder. Generally the distribution of ".css" and image files such as ".gif" or ".jpg" can be considered safe. However ".ews" files contain locally executable template commands that can compromise the Emerald system. See the Emerald Web Extensions guide for more information on ".ews" template files.

The following files are located in the "default" themes folder.

css_cust.css	Emerald style sheet covering the Emerald Signup Server and Customer Account Center.
css_cust_custom.css	Emerald custom style sheet covering the Emerald Signup Server and customer Account Center. The custom style sheet is loaded after css_cust.css therefore styles defined in this file take precedence over similarly scoped classes in css_cust.css
css_main.css	Main Emerald style sheet covering the Emerald Client and Emerald Admin interfaces.
css_main_custom.css	Custom Emerald style sheet covering the Emerald Client and Emerald Admin interfaces. The custom style sheet is loaded after css_main.css therefore styles defined in this file take precedence over similar scoped classes in css_main.css
buttons_admin.ews	Template used for rendering top level set of Admin menu options
buttons_admin_sub.ews	Template used for rendering all sub level set of Admin menu options
buttons_billing.ews	Template used for rendering Emerald client billing menu options
buttons_cust.ews	Template used for rendering top level customer account center menu options
buttons_custset.ews	Template used for rendering account center customer settings menu options
buttons_history.ews	Template used for rendering MBR account history menu options
buttons_incident.ews	Template used for rendering MBR/Service incident menu options
buttons_invoice.ews	Template used for rendering MBR invoice menu options
buttons_main.ews	Template used for rendering top level Emerald client menu options
buttons_mbr.ews	Template used for rendering MBR level menu options
buttons_pkg.ews	Template used for rendering MBR Package menu options
buttons_report.ews	Template used for rendering Reporting menu options
buttons_sa.ews	Template used for rendering MBR Service menu options
buttons_search.ews	Template used for rendering Emerald client search menu options
buttons_statement.ews	Template used for rendering MBR statement menu options
buttons_support.ews	Template used for rendering Emerald client support menu options
custom_admin_header.ews	Allows custom inclusion of additional information in the Emerald admin header before the top level menu options.
custom_cust_footer.ews	Allows custom inclusion of additional information in the footer class of the Customer Account Center.
custom_cust_header.ews	Allows custom inclusion of additional information in the header of the Customer Account Center before the top level menu options.
custom_cust_status.ews	Allows custom inclusion of additional information in the Account Status display of the Customer Account Center after all internal status fields are displayed.
custom_main_header.ews	Allows custom inclusion of additional information in the header of the Emerald Client main menu before the main menu options.
custom_mbr_aftermenu.ews	Allows custom inclusion of additional information in the MBR header after the MBR menu options.
custom_mbr_edit.ews	Allows custom inclusion of additional information in the MBR edit form. *
custom_mbr_header.ews	Allows custom inclusion of additional information in the MBR header before the MBR menu options.
custom_mbr_save.ews	Allows custom inclusion of additional information within the MBR save transaction when saving changes to an MBR.
custom_pkg_aftermenu.ews	Allows custom inclusion of additional information in the MBR Package menu after the package menu options.

custom_pkg_edit.ews	Allows custom inclusion of additional information when editing an MBR Package after the expiration dialogue.
custom_sa_aftermenu.ews	Allows custom inclusion of additional information in the MBR Service after the service menu options.
custom_sa_edit.ews	Allows custom inclusion of additional information within the Service edit form after the custom data dialogues.
custom_sa_header.ews	Allows custom inclusion of additional information in the MBR Service before the service menu options.
custom_sa_save.ews	Allows custom inclusion of additional information when saving an MBR Service after the save transaction has completed.
custom_signup_footer.ews	Allows custom inclusion of additional information in the footer of the Signup server
custom_signup_header.ews	Allows custom inclusion of additional information in the header of the Signup server
custom_signup_contact.ews	Allows custom inclusion of additional information in the contact form of the signup server after the login and password fields.
custom_signup_pay.ews	Allows custom inclusion of additional information in the payment form of the signup server after the pay method specific fields are displayed
hp.ews	Displays the "Welcome to Emerald" message when an operator clicks the Home menu option in the Emerald client.
hp_incidents_f.ews	See hp.ews
hp_main_f.ews	See hp.ews
menu_detail_mbr.ews	When showing MBR detail in the Emerald client this glues together information from various sources.
menu_detail_pkg.ews	When showing MBR package detail in the Emerald client this glues together information from various sources.
menu_detail_sa.ews	When showing MBR Service in the Emerald client this glues together information from various sources.
signup_done.ews	Called after the customer signup process has completed successfully.
signup_intro.ews	When customer first accesses the signup server this menu is loaded first which provides an introduction, EULA…etc. When finished the intro should link to signup_package.ews to begin the signup process.
signup_progress.ews	When using the signup server signup_progress.ews is responsible for displaying the progress bar at the top of the screen.
_login.ews	Displays the initial Emerald Login/Password screen when accessing Emerald. Note the _ character in _login.ews instructs Emerald not to enforce operator file security checking on the file.

Languages

The Emerald Client, Customer Access Center and Signup Servers support for multiple languages is controlled by language translations configured through this menu. Generally selection of the best language for the operator is chosen automatically based on the web browser's language configuration. If a translation for the browser's first language choice is not available

							Languages
ID	Active	Allow Update	Description	Base URL	HTTP Accept Lang		
1	Yes	Yes	English	/docs	en		Add Data | Edit Translation
3	Yes	Yes	Spanish	/docs	es		Edit Translation
4	Yes	Yes	French	/docs	fr		Edit Translation
5	Yes	Yes	German	/docs	de		Edit Translation
6	Yes	Yes	Portuguese	/docs	pt		Edit Translation
7	Yes	Yes	Japanese	/docs	ja		Edit Translation
8	Yes	Yes	Chinese - Simplified	/docs	zh		Edit Translation
9	Yes	Yes	Korean	/docs	ko		Edit Translation
10	Yes	Yes	Arabic	/docs	ar		Edit Translation

Emerald falls back to using subsequent backup languages configured in the browser. If there are no language matches the English language is used. Emerald operators can override language auto detection from the Operator preferences menu in the Emerald client.

It's important to note the translations provided with Emerald are more or less automated machine translations from US English. We welcome feedback from those with the resources to improve upon default translations provided with Emerald.

Use the "Add Data" link on the English language row to add additional StringIDs to support localization of custom additions to Emerald or add language support to items such as Service Types, Charge Types, Packages…etc.

ID	Internal language Identifier. If providing a translation for an established language not specified please contact IEA Software support to reserve a language identifier for this language. If providing a translation for internal purposes (Customizing fields..Etc) You must choose an ID starting above 10000.
Language	Name of the language or dialect in English
Active	When active is "Yes" the language is loaded at startup and available to be used.
Allow String Updates	When "Yes" Emerald product updates will automatically update the translation for this language if there are any applicable corrections available. When "No" translation corrections are not applied to as a result of future Emerald software updates. If you have customized or corrected a translation you should choose "No" to prevent your changes from being overwritten the next time the Emerald software is updated.
HTTP Accept Language	The language abbreviation used to match with browser selected languages
Base URL	Reserved for future use.
Sort Order	Controls presentation of languages in the language listing.

Editing Translations

To edit an existing translation or create a translation for a newly added language select the "Edit Translation" option from the language listing above. The translation process is fairly straightforward. The String ID and English description of the item is found on the left while the translation for the item is entered in the translation box on the right. When finished updating or adding a translation click the "Update" button at the very bottom of the translation form.

In order for changes to translations to take effect the Emerald Web Server service / process must be restarted. The "Apply" button in Emerald Admin cannot reload language data. To assist with the translation process there is a special debug option "Language Debug" available in the Emerald configuration server (/settings URL) under "Debug options". This setting enables language debugging whereby for each string of text displayed the internal StringID of that text is shown throughout the web interface.

License Keys

Once you have successfully created your Emerald database, you need to register your initial Emerald software license. Login using the admin account and follow the license link. Alternately select the "Admin" / "Web Interface" / "License Keys" link and add the license key(s) you were provided with.

Note:

| When you login to the system, prior to entering your license key, your system access will be extremely limited and Emerald will consistently present an informational message regarding insufficient licensing of the product. |

Emerald license keys are configured within the **License Keys** option under the **Admin/Web Interface** main menu option. If you later choose to update your license information (for example add more MBRs) you will select this option as well.

Adding a License

To add a new license key, choose the **Add License** option.

When you purchase Emerald, Evaluate Emerald, or add additional MBRs, you will receive an Email 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. Press the Add Key button once the information has been entered.

Signup Servers

Emeralds integrated signup server allows new customers to sign-up and pay for new services without operator intervention. Many signup servers can be configured to service multiple organizations or provide a more personalized signup offering to a given audience. The signup server depends on two main components "Themes" and "Package Types". Themes allow for customization of the look and feel of the signup interface while package types provide a menu of service offerings customers choose from during the signup process.

Each signup server is associated to exactly one theme. You must first define at least one theme before you can use the signup server. For more information on themes please see the "Admin" / "Web Interface" / "Themes" section of this document. Note: You don't necessarily need to create a theme folder or do any UI customization however a unique theme must be created for each signup server via the themes menu.

Package Types enable you to configure a variety of service offerings. Depending on the configuration of package types you can offer recurring services, non-recurring services, and non-recurring services and packages. The offerings available depend on the configuration of accessible package types having "Customer Signup" enabled or just a single package type configured in the signup server (See below). For more information on configuring package types please see the "Admin" / "Service Types" / "Package Types" section of this document. Note: At least one available package type having the "Customer Signup" option enabled is required to use the signup server.

Logging into Emerald with an operator account that is a member of the CustomerSignup operator group starts the signup process. By default Emerald includes the operator 'signup' with a password of 'signup' for this purpose. More information on configuring Operators is available from the "Admin" / "Security" / "Operators" section of this document. When linking to the signup server you can include the signup server's login credentials as part of the signup URL allowing the user to begin the signup process without having to manually enter the signup server username and password. An example URL for this purpose is: http://demo.iea-software.com/login.ews?user=signup&password=signup

If multiple signup servers will be used throughout your Emerald system the same "Signup" operator can be reused for multiple
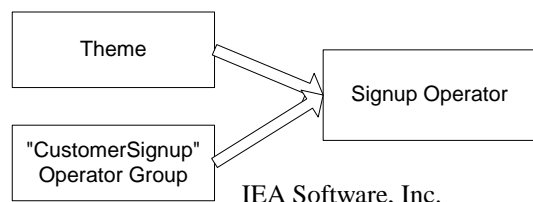
signup servers if the relevant theme is chosen by an outside means such as examining the clients IP address or DNS host name of the request. You may for example associate https://demo1.myemeraldserver.com with theme1 and https://demo2.myemeraldserver.com with theme2. If there are no differentiating factors available such as client IP or DNS host name you can support multiple signup servers by creating a new Operator in the "CustomerSignup" operator group for each signup server and assigning the new operator to the theme associated with its signup server. For example Operator "signup1" is made a member of the "CustomerSignup" operator group and assigned to the "theme1" theme while Operator "signup2" is also made a member of the "CustomerSignup" operator group however they are assigned to the "theme2" theme. "theme1" is assigned to the first signup server and "theme2" is assigned to the second signup server. (See below for information on associating themes with signup servers)

The following diagram shows each step of the signup process.
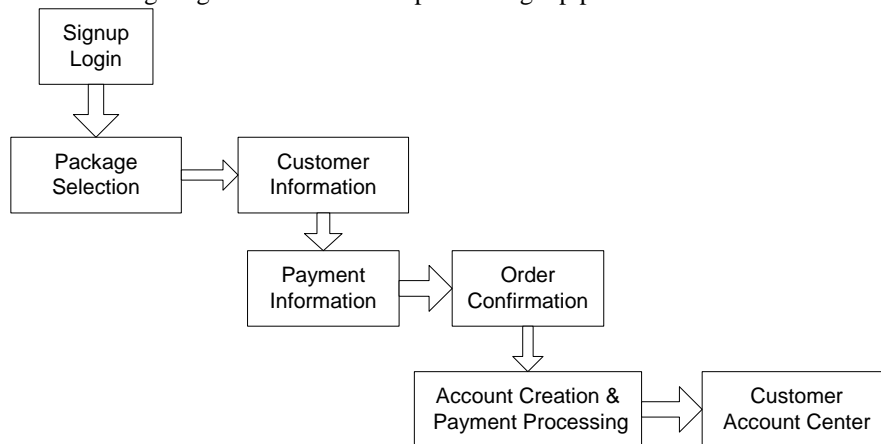
- Signup Login – New customer logs into Emerald using the signup account or login credentials are provided automatically via URL link from an external site.

- Package selection – Customer chooses a package from the list of available options. Package selection determines the new accounts pay period, billing cycle as well as initial services and charges. When configuring "Package Types" and "One Time Charges" its important to be as descriptive as possible in the customer description field fully explaining the features, benefits and terms of each option.

- Customer information – Provides for the collection of Customer contact information such as Name, Address, Login and Password. Many of the customer information related fields could be selectively hidden from view when defining a signup server. This allows you to customize the amount of detail required of your new customers.

- Payment Information – Provides for the collection of Customer payment related information such as the selection of a pay method and any necessary pay method related data such as credit card or prepaid card account numbers.

- Order confirmation – This area provides an overall summary of the selected package and customer entered data. This allows the customer to review their signup for errors or changes before committing to signup for new services.

- Account Creation – After an order is confirmed by the customer and customer input validated by Emerald the account and any initial invoices and payments are applied.

- Customer Account Center – After the account creation process the user is automatically logged into the customer account center where they can then make further changes to their account or check on the status of invoices or payments. More information on the customer account center is available via the Emerald 5 customer account center guide.

Description	Text describing purpose and optionally the owner of this signup server
Theme	The theme associated with this signup server. Note that only one signup server can be associated wit any one theme.
Billing Group	Billing Group new signups are to be assigned.
Region	Region new signups are to be assigned.
Country	If set all users of this signup server are assumed to be located in the specified country.
Domain	Domain name new signups are to be assigned
Discount	Discount assigned to the MBR Service created by the signup process
Sales Person	Sales person to credit the new signup to
Package Type	When "All" all available package types can be selected during signup. When a specific package type is selected only that package types and associated time charges are available for signup. Once a package type is chosen additional package types can be added by clicking the 'Add Package Type' button located directly below the signup server form.
Setup Charge	When "Yes" any setup charges configured for the new service or package are applied when the account is created. When "No" setup charges are not applied at signup.
Prepaid Card Credits	When "Transfer all available credits" and a prepaid card is used to fund the signup operation the full prepaid credit amount remaining available to the card is transferred to the new accounts balance even in cases where the cost to open the new account is significantly less than the cards remaining available balance. This is the default and recommended setting.

When "Transfer invoiced cost only" only the amount necessary to initially open the new account is transferred from the prepaid card. This allows one card to be used to fund multiple separate signup operations. If there is insufficient balance remaining on the card to fund the initial signup another card with sufficient balance must be provided. |

Login Auto Fill Type	Sets the default value of the customer login field. based on given information such as First and Last Name.
Show Referred By	When "Yes" the referred by field is displayed in the signup form
Show Phone	When "Yes" customer phone fields are displayed in the signup form
Show Email	When "Yes" the email field is displayed in the signup form
Show Company	When "Yes" the company field is displayed in the signup form
Show Address	When "Yes" customer address fields are displayed in the signup form
Show Alt Address	Allows an additional address to be collected during signup based on an available address type configured from the General / Address Types menu. Note: The primary address is used exclusively to determine susceptibility of an account to tax. Any Country or State selected via an alternate address has no effect on the calculated tax for a set region.
Alt Address Msg	When an alternate address is chosen this sets the message displayed in the signup server to let the end user know the condition for selecting it. An example Alternate Address message might be "I need to specify an alternate shipping address". If no alternate address message is defined the address types description is used instead.
DNS 1	Primary DNS Server
DNS 2	Secondary DNS Server
IMAP 4	Mail server IMAP4 address
POP 3	Mail server POP3 address
SMTP	Mail server SMTP address
NNTP	Mail server NNTP address
Misc 1	Miscellaneous field – unused
Misc 2	Miscellaneous field – unused
Log Off URL	Reserved for future use
Browser Title	Sets the default title in the browsers title bar appearing on each signup server page. If no title is set the default browser title is "Emerald Management Suite"
Comments	For informational use only

Press the **Update** button to save any new or modified Signup Server option value changes.

Client Settings

Global and billing group level Emerald operator client settings are provided via this menu.

Global Group	When "Global Settings" is selected the options set in this form apply globally to all billing groups not having a group specific configuration. Billing groups having a different configuration from the global group appear with a "*"

	before their names.
Support URL	Help URL displayed in error forms throughout Emerald.
Unique Login Checking	When "No" unique login checking is disabled. When "Per Domain" unique login checking is done in a per domain basis. When "System Wide" unique login checking is done on all services in Emerald.
Login Character Restrictions	Determines acceptable characters when entering service login information. The chosen limitations apply only to the Login field at the service level.
Min Password Length	Minimum allowed MBR Service password length
Random Password Length	MBR Service auto generated random password length
Show Currency Code (Reports)	When "Yes" the organizations three-letter currency code is displayed throughout Emerald reports center wherever currency values are shown.
Show Currency Code (Client)	When "Yes" the organizations three-letter currency code is displayed throughout the Emerald operator interface wherever currency values are shown.
Show Expired Accounts by Default	When "Show" the expired checkbox is checked by default in the account search form. When "Hide" the expired checkbox is not checked by default.
Show Inactive Accounts By Default	When "Show" the inactive checkbox is checked by default in the account search form. When "Hide" the inactive checkbox is checked by default in the account search form.
Phone Number Search	When 'Normal' MBR Phone fields are searched exclusively with a starts with pattern match. Normal mode uses database indexes to perform number searches efficiently. When 'Substring' MBR Phone fields and MBR Address phone fields are searched with a smart substring pattern match excluding common number delimiters such as '-(). ' Substring searching cannot take advantage of database indexing. On large systems this mode can be much slower than Normal mode.
Location Datasets	Specifies which location datasets should be updated or installed when an updated version of the Emerald Suite is installed.
Database Version	Contains current internal database version number. If the product version is higher than the current internal database version the Emerald database is automatically updated when the Emerald web server starts. If Database Version is set to a lower value and Emerald Restarted the database update process will start automatically. If Database Version is set –1 no database updates will be executed against the Emerald database even when a new version of the Emerald Suite is installed.
Database EWS Binding	Please do not make changes to this field unless directed by IEA support personnel.

Operator Limits

Operator Limits determines maximum count of records returned by search operations globally and operator group basis. For all fields a value of 0 indicates no limit is enforced.

Global Group	When "Global Settings" is selected the options set in this form apply globally to all billing groups not having a group specific configuration. Billing groups having a different configuration from the global group appear with a "*" before their names.
Search Results Max	Maximum rows returned by account search operations
Max Invoices Per Batch	Total number of invoices allowed to be created for any single invoicing run. May be used to split up large invoice runs throughout time.
Max Invoice Preview Batch	During invoice previews from the Emerald Client / Billing / Create Bills menu limits the number of invoices that may be displayed for preview.
Max Invoice Print Batch	Invoices added to the print queue for postal delivery from Emerald Client / Billing / Send Bills menu are restricted in their per print batch count of invoices by this field. The feature is often used to make processing and printing more manageable with a large subscriber base.
Max Statements Per Batch	Total number of statements allowed to be created for any single invoicing run. May be used to split up large statement runs throughout time.
Max Statement Preview Batch	During statement previews from the Emerald Client / Billing / Create Bills menu limits the number of statements that may be displayed for preview.
Max Statement Print Batch	Statements added to the print queue for postal delivery from Emerald Client / Billing / Send Bills menu are restricted in their per print batch count of statements by this field. The feature is often used to make processing and printing more manageable with a large subscriber base.

Operator Settings

System wide operator security and locale defaults are configured from this menu.

Idle timeout (Seconds)	Count of seconds between operator client web requests with no activity before timing out and forcing the user to logon again to access Emerald. Enter the value in number of seconds. This value must be greater than 300.
Bad password lockout interval (secs)	When an operator attempts to authenticate more than once providing an invalid password this sets the retry lockout interval the operator must wait before being attempting to re-enter their password. This feature is intended to mitigate online dictionary attacks against operator passwords.
Max Months of Customer History to Display	Controls maximum number of months of account history to show in the MBRs history display.
Operator Home Page	Controls where the operator home page status information display is visible. The contents of the status display are controllable via the themes system. (hp_main_f.ews) See "Themes" for more information.
Credit Card Swipe	When enabled the operators browser listens for keyboard input from barcode scanners and credit card readers bringing up the appropriate account information within Emerald when a card swipe or barcode scan is detected. When disabled no keyboard monitoring is performed.
Default date format	System default date format to use when not defined via operator preference.
Default date separator	System default date separator to when not defined via operator preference.

Customer Settings

Customer Account Center general options and access rules are configured both globally and on a per billing group basis via this menu.

Global Group	When "Global Settings" is selected the options set in this form apply globally to all billing groups not having a group specific configuration. Billing groups having a different configuration from the global group appear with a "*" before their names.
Customer Website Name	Title displayed at the top of the customer account center before the menu options. Default value is "Customer Account Center"
Customer Website StringID	Provides language support for the "Customer Website Name" field above.
Customer Website Logo URL	URL of a logo image to display in the Customer Account Center directly above the "Customer Website Name" title bar. Used for simple branding of the account center on a global and per billing group basis.
Customer Website Allow MBR Cancel	When "Yes" services with "Manager" remote access enabled are allowed to cancel their entire MBR via the customer account center interface. When "No" MBR level cancellation is disabled for accounts via the customer account center however cancellation on a per service basis may still be permitted depending on the accounts package assignments. See "Package Service Types"
Customer Website Logout URL	After a customer manually logs out of the customer account center by selecting the "Log Off" menu option they can be directed to the URL specified here instead of the default Emerald Login screen if no value is entered in this field.
Customer Website Allow Payment	When "Yes" customers are allowed to make payments directly from the customer account center.
Customer Website Allow Prepaid Recharge	When "Yes" customers are allowed to use a new prepaid access card to recharge the account expiration, time left, data left and credit amount based on what is available on the new prepaid card. For recharge to work the card must have "Direct Use" enabled and must have a direct use service type matching the end-users service type.
Customer Website Hide Payment on Credit Balance	When "Yes" the Make Payment option in the customer account center is hidden from view unless there is an outstanding balance on the account. This prevents users from applying payment to their account when there is not a corresponding charge. When "No" the Make Payment option if available is always displayed regardless of the customers current account balance.
Customer Website Allow Pay Method Change	When "Yes" customers with "Manager" remote access enabled are allowed to change their current pay method to choose manual or automatic payment via credit card.
Customer Website Show Currency Code	When "Yes" the organizations three-letter currency code is displayed throughout the Emerald customer center wherever currency values are shown.
Customer Website Show Billing History	When "Yes" and "Manager" remote access is enabled a history of the MBRs invoices, statements and payments are visible from the Customer Account Centers "Billing Info" page.
Customer Website Show Available Credit	When "Yes" available credit amount based on MBR credit limit and current account balance is displayed in the account status area of the customer center. When "No" credit limit information is not displayed.
Customer Website Incident Access	When "Yes" customers are able to add new incidents, add actions to existing incidents and view all incidents in their account with

	Customer Access enabled from the Assistance link in the customer account center. Note when upgrading from Emerald 4.5 customer access is disabled during the database upgrade for all pre-existing incidents.
Customer Website Show Call History	When "Yes" records of customers RADIUS call history are available from the "Usage History" menu within the account center. Accounts with "Manager" remote access enabled can view the account history of all services within the MBR while those without "Manager" remote access enabled can view only their accounts usage.
Customer Website Allow Time Purchase	When "Yes" accounts are able to make one-time service access purchases from the customer account center via the "Purchase Time" menu option. See "Admin" / "Accounting" / "One Time Charges" for additional information.
Customer Website Allow Password Change	When "Yes" accounts are able to change their access passwords via the "Account Settings" link of the customer account center. Accounts with "Manager" remote access enabled with a package having both "Customer Access" and "Customer Allow Password Change" enabled can also change account passwords using the "Manage Accts" menu options. See "Package Types" for more information on configuration packages.
Customer Website Allow Login Change	When "Yes" accounts are able to change their access logins via the "Account Settings" link of the customer account center. Accounts with "Manager" remote access enabled with a package having both "Customer Access" and "Customer Allow Password Change" enabled can also change account passwords using the "Manage Accts" menu options. See "Package Types" for more information on configuration packages.
Customer Website Email Notification Settings	When "Yes" "Email notification options" are available from the customer account center. These options allow the customer to choose which events they can receive email notifications for. Currently available notification options include incidents, account status, announcements and special offers.
Customer Website Confirm Logout	When "Yes" a JavaScript confirm dialogue is displayed when accounts in the customer account center choose the "Log Off" menu option. When "No" the customer is logged out and not shown the confirm dialogue.
Customer Website Require CC AVS	When "Yes" customer making credit card payments must submit Address information in order for the transaction to be accepted. Note the enforcement of an AVS match and availability of AVS matching is not controlled by this menu option. This field simply makes inputting of address information a requirement.
Customer Website Require CC CVV2	When "Yes" customer making credit card payments must submit the CVV2 security code found on their credit cards. Due to usage rules the CVV2 code is cleared directly after the card transaction has completed. Automatic recurring credit card payments cannot transmit CVV2 information. It is against Visa and others operating rules to modify the Emerald transaction system to retain this data. When "No" entering of CVV2 data is optional.
Customer Website Default Login Fill Type	When an account adds a new service from the customer account centers "Manage Accts" menu the selected fill type is used to automatically set a default login name based on the fill type criteria such as First and Last Name.

Database

The database section of the Emerald Administrator allows you to perform basic database functions including running queries and monitoring the status of the Database server.

SQL Query

The SQL Query allows you to execute and SQL command and see the results. Emerald will automatically format the results into an HTML table for display. Only one SQL command should be executed at a time.

Current Activity

The Current Activity shows each connection to your SQL server, the states of the connection, and depending on conditions and database platform the last or current SQL command that was or is executing on that connection.

Backup Emerald

When Emerald is used with the Microsoft SQL server platform "backup emerald" allows the Emerald database to be backed up to a file on the database server's local disk. The functionality provided is limited when compared with the database backup and maintenance wizard included with Enterprise manager/Management Studio and is intended for use only with those customers using Emerald /w MSDE. We recommend using Microsoft Enterprise manager or Management Studio when available to configure backup and maintenance schedules for the Emerald database. Those using Oracle must use the backup facilities included with their database.

Appendices

Appendix A: Trouble Shooting and Frequently Asked Questions

Installation Issues

- *What installation option and components should I choose during install?*

  The 'Typical' installation option will be sufficient for most Emerald sites.   Typical installations include the Emerald Web Server, the Emerald Scheduler, and RadiusNT/X components. The 'Complete' installation option will install all of the additional Emerald components and the 'Custom' installation option will allow you to specifically choose the additional components you would like installed. All installation options include installation of the full set of Emerald documentation. The additional components available outside of the 'Typical' installation are:
    - *EmerNet*: Network traffic flow collector for IP Billing
    - *EmerLdap*: LDAP synchronization server for integrating third party external systems.
    - *EmerAuth*: External authentication library currently supporting Imail, Serv-U FTP and Dnews.
    - *SysLog*: Used to log messages and errors within systems supporting syslog such as routers and access servers to Emerald.

- *Previous versions of Emerald required separate installations on each of the intended client machines. Is this required with Emerald Version 5.0?*

  Emerald Version 5.0 is browser-based, requiring only one Emerald Server installation. Client access to the Emerald server is gained through the use of a standard web browser.

- *Can I install RadiusNT/X on multiple machines? Does it have to be installed on a machine running Emerald? Can I install RadiusNT/X from the Emerald installation disk?*

  RadiusNT/X can be installed on multiple machines within the restrictions of your Emerald and/or RadiusNT/X license agreements. Emerald enterprise edition includes a backup license for RadiusNT/X. All other editions of Emerald require separate license to run multiple RadiusNT/X servers concurrently. The RadiusNT/X server should be installed on a machine that is dedicated to network services, and it does not need to run on the same machine as the Emerald server. It can be installed on either the machine running your Emerald database server, or on another server.   The RadiusNT/X component can be individually selected within the Emerald 'Custom' installation option.

- *Can I install Emerald 5.0 into a directory where a prior version of Emerald is installed?*

  No, you must uninstall any previous versions of Emerald before installing Emerald 5. You may however use the same database server to run instances of previous versions of Emerald by providing a separate database for each instance.

- *Can I upgrade an Emerald 2.5 database directly to Emerald 5.0?*

  No, you must first upgrade your Emerald 2.5 database to Emerald 4.5 using Emerald 4.5 then upgrade from 4.5 to version 5.

- *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 Windows) 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. Generally, all conflicting programs should be shut down before attempting installation.

- *Does the Emerald Server support SSL transactions?*

  Yes

Setup Issues

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

  Most likely the problem is that the prior database device still exists. Use your database server management tool to delete and verify that both the failed database device and the associated physical database and log files have been deleted. If you are having trouble creating a new database from Emerald create the database using Enterprise manager / Management studio and then use the existing "empty" database to proceed.

Startup Issues

- *When I access the Emerald application for the first time, there is no information in the login prompt. What should I initially login with?*

  The first time you log into the Emerald Suite after installation, the default Username and Password values provided for the Emerald Administrator are '**admin**' and '**pass1**', respectively. ***Change the default Emerald Administrative account password immediately upon initial login to the system.***

- *When I access the Emerald Web Configuration Server, it is not accepting my Emerald Administrative password. What should I login with?*

  When prompted, enter any **Username** and provide the general Configuration **Password** provided during installation and initial start of the Web Configuration Server (or other Emerald Management Suite Administrator). The creation and access of this password is described above within the Installation section of this document under Initial Database Configuration.

- *When I attempt to access the Emerald application from my web browser, I keep being returned to the login screen. The browser window validation and drop-down selections do not appear to be correctly updating.*

  It is critical for the operation of the Emerald Management Suite that both *cookies* and *java script* be enabled within the web browser accessing the Emerald Server.

- *The Emerald screen display and available menu options change depending upon which user has logged onto the system. Is this normal application behavior?*

  Emerald security allows the Emerald Administrator to control Emerald Operator access on a page, menu option, and field detail level. The menu options available and the format of the pages displayed directly depend upon the privileges assigned to the Operator Group associated with the logged in Emerald Operator.

Configuration Issues

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

  The database constraints will not let you delete items that are being referenced by other items. For example, to delete a billing group, there cannot be any items referencing it (like region, services, etc) as well as no MBR can be using that billing group. Consider instead inactivating the item or setting a sort order of –1.

- *Some of the changes that I make within the Emerald Administrative options do not seem to be immediately applied by the system. How can I make Emerald apply changes immediately?*

  Click the "Apply" button from "Admin" menu.

- *What types of taxes does Emerald support?*

Emerald supports any number of taxes, including tax on tax piggyback taxes. Tax floors and ceilings, price inclusive, conditional application based on region, state, country and exemptions.

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

Applicable setup charges are configured when a Service Type is created or updated. The Emerald Administrator defines the available Setup Charge options within the *Accounting/Charge Types* Emerald Administrative menu option. Once a Setup Charge has been selected for a Service Type, the charge will only be applied on the first billing period of the Service and can be waived on an individual Service account basis.

- *Can I specify a separate invoice format for each Billing Group?*

The Emerald Administrative *General/Billing Groups* option allows you to define individual company data, as well as individual invoice and statement formats for use with each Emerald Billing Group.

- *My external system batch file format is not supplied in the select list. Can I define a new one that will be supported by the system?*

Emerald Version 5.0 provides a default set of supported external systems batch file formats. Currently, new formats are created through the "Admin" / "Advanced" / "Exports". However the creation of external systems is beyond the scope of this document and product support. Please contact your IEA Software representative for more information on integrating Emerald with third party systems.

- *How come some options do not have the Delete option available?*

In general, throughout the Emerald Administrative options, once an option has been assigned, there is no longer the option to delete the entry. This guarantees the integrity of the Emerald data by not allowing values in use by other parts of the system to be removed. For example, once a Billing Group has been assigned to an MBR, the Billing Group can only be removed if the MBR Billing Group value is re-assigned to a different value.

Security Issues

- *How is Emerald Operator privileges assigned? Can an Operator be in more than one Operator Group?*

Each Emerald Operator must belong to one and only one Operator Group. The permissions of each Operator are based on the privileges configured for the Operator Group of which they are assigned.

Appendix B: Supported Third Party External Systems

The Emerald Management Suite works with many different third-party products. The open nature of the Emerald database and the technical specifications of the suite allow third party applications to easily interact with Emerald. Please see the IEA Software product site for Emerald 5 for an up-to-date list.
http://www.iea-software.com/products/emerald5.cfm

Mail Server Support

Emerald includes automated provisioning support for a number of popular mail systems using several supported interface methods. These methods include RDBMS and LDAP ynchronization, Emerauth DLL and web service synchronization.

Rockliffe Mailsite Configuration

The Emerald Management System supports Rockliffe Mailsite. Mailsite comes out of the box ready to work with Emerald. To use it, simply configure an ODBC DSN pointing to the Emerald database and configure the Mailsite database plug-in to use the newly created Emerald ODBC DSN. Additionally during Mailsite configuration, it must be identified as an External system (using the Mailsite external system ID) within the Emerald Administrator options.

Emerald can be configured to create a mail list of all Emerald users. Emerald includes a stored procedure called "*SendMailUsers.sql*" that will return the list of users stored within Emerald in the format that Mailsite is expecting. If you want to restrict the list, you can modify the stored procedure as needed. Users do not have to be manually added within the Mailsite configuration program. Mailsite will synchronize the systems by specified domain. 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 Configuration

The Emerald Management System supports Internet Shopper NTMail, although the NTMail user API is only supported through the EmerAuth DLL, included within the Emerald Management Suite package. Please see the Emerald EmerAuth component documentation for more details on using it.

Note: Although NTMail supports aliases and forwards, the NTMail API does not include features to support them within Emerald. The NTMail admin can be used to configure aliases or forwards for accounts within NTMail, but NTMail will not use the forward information configured within Emerald user accounts.

Additional Mail server configurations

Additional mail server configurations and details can be found in the Emerald Authentication DLL documentation and the Emerald LDAP synchronization server documentation.

Appendix C. Batch Credit Card Formats

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 specific batch formats expected per supported external system.

In almost all cases during Emerald credit card processing, Emerald will provide a unique transaction number (transid) for each record it batches out to the credit card system for processing. It is important that the external credit card processing system return this transaction identifier unchanged so that Emerald can correlate the transaction results with the original transaction recorded within the Emerald account database.

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

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.

Note: This batch format may not work with the DOS version of IC Verify.

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.

IC Verify

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

Note: This batch format may not work with the DOS version of IC Verify.

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.

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.

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 four fields, comma delimited. The Transaction ID is field 1, 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, otherwise the transactions was denied.

Appendix D. Generic Web Service Account Synchronization

Generic web service synchronization enables Emerald to notify a custom "web service" API of changes to status of accounts managed by Emerald. Leveraging this system initial provisioning and state synchronization of services can be maintained between Emerald and a user defined provisioning system.

External System Configuration

Create a new external system from the Emerald Admin / Services / External systems menu. Choose 'Generic Web Service' from the System Type menu. Configure the URL of your user defined web service that will be consuming provisioning requests. The login and password fields are mapped to the APILogin and APIPassword post request parameter fields in the table below.

General API Instructions

For each item being processed the API sends a POST request containing form variables to a user defined URL for processing and expects an XML formatted response in return.

POST Request Parameters (From Emerald to External system)

Field Name	Type	Description
APILogin	String	Login used to authenticate Emerald to the external API. (Configured via External systems)
APIPassword	String	Password used to authenticate Emerald to external API (Configured via External systems)
APIRef	String	Reference field to identify the Emerald external system to external API (Configured via External systems)
CustomerID	Integer	Customer ID (MBR level ID) of the account

AccountID	Integer	Account ID (Service level ID) of the account
Domain	String	Configured mail domain of the service
chDomain	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
Login	String	Service login field. Login field must not be blank in order to be successfully provisioned.
chLogin	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
Password	String	Service password field. Password field must contain at least two characters to be successfully provisioned.
chPassword	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
FirstName	String	First name of the service
ChFirstName	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
LastName	String	Last name of the service
chLastName	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
ServiceType	String	Reflects service type label of current service type
chServiceType	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
ExternalRef	String	Service type specific reference field to map service type to external system concept of 'type of service'. (Configured via the Service Types - External Systems menu)
chExternalRef	Intger	When 1 field is new or changed. When 0 field has not changed. (See above)
Alias	String	When a service email alias is configured reflects a single alias from the list of aliases. Note: If more than one alias is configured only a single alias is presented.
chAlias	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
Forward	String	When a service email forward is configured reflects a single mail forward from the list of forwards. Note: If more than one forward is configured only a single forward is presented.
chForward	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)
Action	String	Generic record change status <table><tr><td>add</td><td>Record has not previously been exported to the external system.</td></tr><tr><td>update</td><td>One or more fields of the existing record has changed.</td></tr><tr><td>delete</td><td>The service and or MBR has been inactivated and the underlying account should be removed</td></tr></table>
Active	Integer	When 1 the account is active and in good standing. When 0 and the action variable above is not "delete" the account has been temporarily suspended due to expiration/non payment. The user should not be allowed to access to normal services. The service should not be marked for permanent deletion. Background activities such as collection of Email messages should continue. When the action variable is "delete" the service should be considered to be permanently inactive and any steps necessary for removal should be taken. No further provisioning messages will be issued for this account.

Field Name	Type	Description
chActive	Integer	When 1 field is new or changed. When 0 field has not changed. (See above)

Post Response Parameters (From external system to Emerald)

Response must be XML formatted.

Field Name	Type	Description
Retcode	Integer	Indicates status of the provisioning request. When 0 then the request was successful. Any other value means the provisioning request has failed. Any failed requests are retried the next time external system synchronization is run.
Message	String	Text field indicating the status of the provisioning request. When retcode is 0 the contents of the message field is ignored. When retcode is non-zero (request failed) Message is a descriptive text indicating the failure cause. Message is displayed in the show service menu of the Operators services interface if the retcode field indicates a failure.

Response example for successfully processed request:
<retcode>0</retcode><message>looks good</message>

Response example for failed request:
<retcode>-1</retcode><message>not enough resources to complete request</message>