# Emerald

# User's Guide

**Version 6.0.76**

**Emerald Management Suite**

# IEA Software, Inc.

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# INTRODUCTION

Emerald User's Guide focuses on providing background, context and advice on the use of Emerald client interface responsible for day to day management of customer accounts.   Its companion the Emerald Administrator's Guide covers "Admin" menu where configuration of Emerald software itself is managed.

Layout of this document follows closely with menu structure of the Emerald client enabling you to quickly locate areas of interest from the table of contents depending on where you are in the Emerald client.

Displays shown and described in this documentation may differ from what you observe within your organizations Emerald system.  This often can be due to any number of factors including:

- Edition of Emerald your organization is licensed.  For example professional edition features are not displayed when using standard edition license
- Access rights granted to you by your systems administrator
- Customization of field visibility settings throughout Emerald client
- Custom add-ons and changes including customized language translations
- Difference between version of documentation and version of Emerald software
- Emerald administrative settings

For those new to Emerald we recommend reading remaining introductory sections below to get oriented with Emerald user interface and important background on core concepts used throughout Emerald.

## Emerald Installation and System Configuration

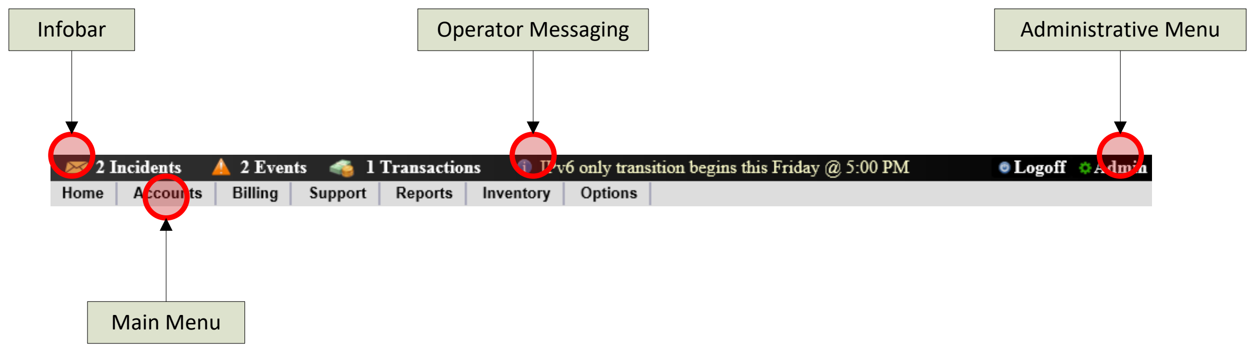
The Emerald Administrator’s Guide details steps necessary for installation and configuration of Emerald Management Suite.  This User's guide assumes Emerald has been fully installed including creation of Emerald database and configuration.  Please contact your systems administrator for access instructions including URL to access Emerald, client certificates and login credentials.

## Logging on to Emerald

If using certificate authentication the common name of your client certificate is displayed at the top of Emerald login page.  If your certificate is not displayed close all web browser windows or restart your computer and try again.


## Client Menu

After logging on as an operator Emerald client menu is displayed.




| Menu Item | Description |
|---|---|
| Infobar | The information bar notifies operators with summary of items that may require your attention. Clicking the heading displays associated details. Items appearing within Infobar are configured from Emerald Client / Options / Infobar Settings. |
| Operator Messaging | Messages from your system administrator are displayed if available when "Operator Messaging" is set "Show" within Infobar Settings. |
| Home | Home is initial destination displayed immediately after successful Emerald login. Home hosts a customizable operator dashboard once one or more dashboard widgets have been assigned to your operator account from Emerald Client / Options / Manage Dashboard. |
| Accounts | All MBRs, Services and related account information within Emerald are managed from the accounts menu. Accounts include extensive search facilities to quickly locate existing MBRs and related information. Process of creating a new MBR is also managed from Accounts menu. |
| Billing | Provides system wide and billing group level management of billing related activities including invoice and statement creation, email and printing, batch credit card processing, management of failed transactions and payment posting.<br><br>Invoice and statement creation, emailing and CC/EFT batch processing can be automated to process continuously without operator intervention from Emerald Admin / Scheduler / Configure Schedules. See Emerald Administrator's guide for details on scheduler configuration. |
| Support | Search and manage incidents, events and send bulk messages.<br><br>Incidents are synonymous with "tickets" normally entered to document customer interactions or note cases where additional action is necessary to resolve an outstanding problem or question.<br><br>Events normally reflect service affecting outages such as a power or equipment failure. Events have a dual purpose of alerting operators to status of known problems and offering a means of centrally managing status of all related incidents.<br><br>Bulk messaging allows operators to send one-off messages to all or subset of customers via Email or SMS. |
| Reports | Offers network session, exceptions and log search, financial, account status, incidents, inventory and appointment reporting on a global and billing group basis. Custom reports may be configured by administrators wishing to provide customized views of available Emerald data. |
| Inventory | Receive new physical and virtual items to inventory, search and manage existing inventory. |
| Options | Operator preferences include password change, localization options (language, date format and units of measure) and customization of UI elements including theme preference, information bar, operator dashboard setup and field visibility customization. |
| Admin | Provides access to Emerald configuration interface described within the Emerald Administrator's guide. |

## GETTING HELP

Product documentation is installed with Emerald Management Suite depending on features selected during installation. Following table describes locally installed documentation. On Windows platforms documentation is accessible from "Docs" subfolder of Emerald program group of start menu. For Linux installations file location follows "Filename" column of table below.

| Document | Filename (Unix) | Description |
|---|---|---|
| Administrator's Guide | /usr/local/emerald/docs/emeradmn.pdf | Administrators guide covers product installation, maintenance and configuration. Everything managed via Emerald "Admin" menu is covered |
| User's Guide | /usr/local/emerald/docs/emerald.pdf | See Introduction |
| Customer Account Center | /usr/local/emerald/docs/emercust.pdf | Customer account center documentation for end user self-management portal. |
| Authentication DLL | N/A | Emerald authentication DLL used to provide an interface between Emerald and several windows server based external systems. |
| Network Collector | /usr/local/emerald/docs/emernet.pdf | Network flow collector for usage based rating using Cisco NetFlow, IPFIX or passive monitoring. |
| LDAP synchronization | /usr/local/emerald/docs/emerdap.pdf | Synchronize account data from Emerald with an LDAP schema for directory based external system integration. |
| RADIUS Test Client | /usr/local/radius/radloginv4.pdf | Simulates an access server for purpose of RADIUS testing and RADIUS server monitoring. |
| RadiusNT/X EAP Authentication | /usr/local/radius/radiuseap.pdf | EAP authentication features and configuration related to RadiusNT/X and Emerald. |
| RadiusNT/X Users Guide | /usr/local/radius/radiusv5docs.pdf | Primary configuration and technical detail for RadiusNT/X. |
| Air Marshal User's Guide | /usr/local/portal/doc/airmarshalv2.pdf | Air Marshal captive portal / access gateway administration and customization. |
| Emerald Change History | /usr/local/emerald/docs/changes.txt | History of new features and bug fixes to Emerald by version and release date. |
| RadiusNT/X Change History | /usr/local/radius/changes.txt | History of new features and bug fixes to RadiusNT/X by version and release date. |
| Air Marshal Change History | /usr/local/portal/doc/changes.txt | History of new features and bug fixes to Air Marshal by version and release date. |

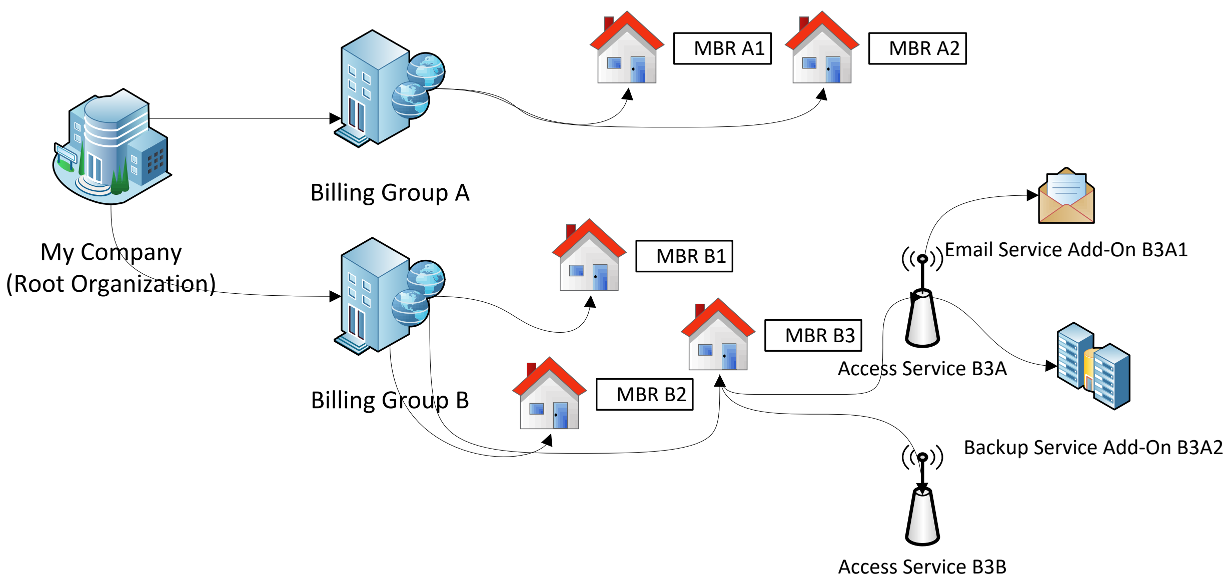
Latest versions of all product documentation and additional resources for technical assistance is accessible from our website: https://www.iea-software.com/help

# CONCEPTS / DEFINITIONS

Following sections offer details on aspects of Emerald suite important for managing customer accounts.

## Account Hierarchy

Accounts are organized within Emerald based on a multi-tier design. The topmost tier is the "Organization" representing entity responsible for collecting monies related to billing activities. Under the organization one or more "billing groups" provide a means of organizing related customer accounts for example by subsidiary or market. Within a billing group "Master Billing Records" (MBRs) are assigned. MBRs correspond to subscriber accounts. All billing related activities such as invoicing and payments occur at the MBR level. Finally within an MBR any numbers of services are assignable. Services generally represent recurring charges such as monthly fee for service provided to the customer. Examples include Internet access, hosting, email and value added services. For more details about each tier please see the table below.

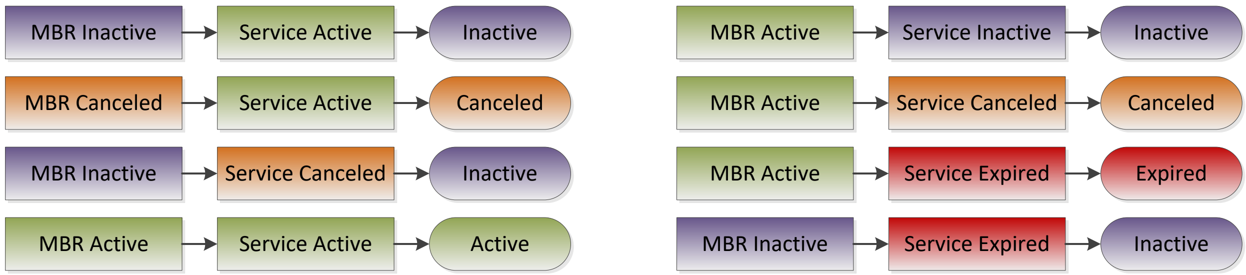



| Level | Description |
|---|---|
| Organization | Organizations are a grouping of "Billing Groups" owned by the same entity. Organizations separate the monies managed by each company for reporting purposes, define the currency used throughout each organization and provide for the configuration of reseller relationships where an Organization is able to be billed for the services they provide by a parent organization.<br><br>When using Emerald reseller billing feature each reseller is assigned their own organization and billing group enabling them to manage and bill their own customers separately from other resellers and the host company operating Emerald.<br><br>If Emerald is used in a multi-tenant environment where multiple ISPs are sharing the same instance of Emerald there will generally be an organization assigned to each ISP to enable monies to be reported and tracked separately within each ISP. |
| Billing Group | Billing Group defines a set of MBRs having common billing characteristics. Billing |

| | |
|---|---|
| | Groups are important to Emerald's configuration because they allow different billing features, reporting, access controls and options to be designated to only a subset of MBRs sharing a common billing group.<br><br>Billing groups are commonly used to partition customer types for example "Residential Customers" vs "Business Customers" or to support partitioning of multiple organizations, resellers or venues within a common instance of Emerald. (e.g. "ISP A", "ISP B", "Reseller C")<br><br>The particular billing group assigned to an MBR is able to affect availability of most configuration choices when managing MBRs and services. When combined with themes, group level operator access controls, customized invoices and payment processors it is possible to offer a wide range of scenarios from simply organizing related accounts to isolating multiple organizations with separate customers and staff within single instance of Emerald. |
| MBR | The MBR describes billing contact and related configuration information for each subscriber including name and address, billing cycle, payment method and bill delivery options. All billing related activities such as invoicing and payments occur at the level of the MBR level. There is a single account balance for the MBR. An MBR can represent an individual, household or business provided all fees and payments are managed together.<br><br>For example an organization with 100 employees charged for hosted services may have a single MBR billing 100 separate services for each employee. If organization is accepting a single bill for all 100 services then only one MBR for the entire organization is necessary.<br><br>If instead the organization wishes some employees to be charged separately to a different account reflecting separate organizational structure within the company then multiple MBRs will be necessary to distribute employee services to MBR based on organizational structure. |
| Service | Services, also known as sub-accounts are used primarily to assign one-time and subscription based service provided by your company to the customer. Examples include network access, email accounts, backup services, domain and hosting.<br><br>Once an MBR is created an unlimited number of services can be applied to the MBR as needed. Services store authentication data such as login and passwords for services requiring authentication such as network access and email accounts. They also track invoicing and service expiration data to facilitate automated recurring billing. |
| Child Service | Services can be organized into arbitrary hierarchies of parent and child services. Child services can be used to modify the parent service or provide add-on and value-added features to an existing account.<br><br>For example a child service of type "turbo boost" is added as a child of an existing network access service. This has the effect of increasing amount of bandwidth normally allocated to the parent network access service.<br><br>Parent/child hierarchy is also be used to facilitate packaging of related services. For example a network access service may include up to 3 free accompanying email accounts. In this case it is common to attach email account as child services of the network access service to enable the email services to automatically receive bundled discount. |

## Account Status

Effective states of accounts are influenced by MBR and Service hierarchy. The most restrictive state an MBR is currently in determines least restrictive disposition of services within the MBR. States from order of least to most restrictive are Active, Expired, Canceled, and Inactive.

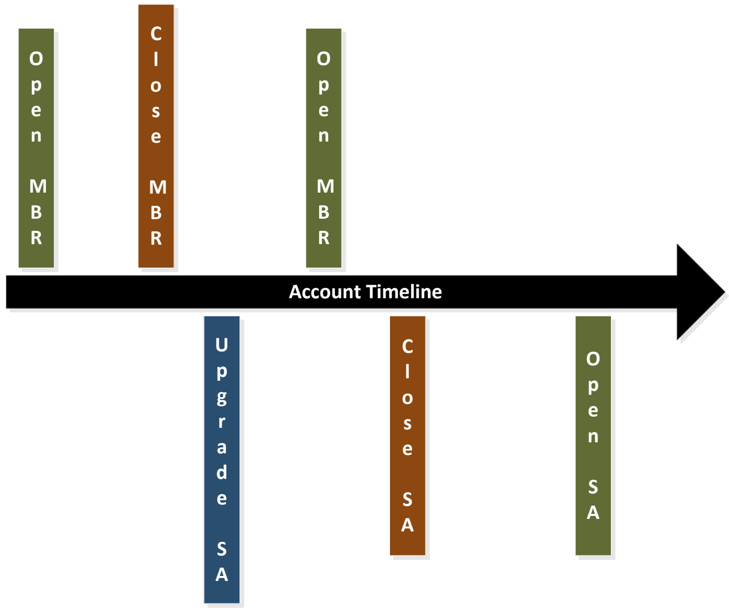



| Status | Level | Description |
|---|---|---|
| Active | MBR | An active MBR generally indicates active field of the MBR is set "Active" when editing MBR. Depending on context a statement the MBR is active may or may not include canceled disposition of the MBR.<br><br>While a recurring MBR is active the MBR shall count against licensed MBR limit. Billing related activities such as invoicing and CC/EFT transaction processing are allowed to proceed and active services within the MBR continue to be accessible. |
| Active | Service | A service is generally said to be active while all of the following conditions are met:<br><br>• MBR and service are set active<br>• MBR and service are not canceled<br>• Balance forward MBR has not exceeded credit limit<br>• Service is not expired<br>• Service has not exceeded data or time consumption limits<br><br>When active RADIUS authentication and external systems are available to the user. |
| Expired | MBR | Expiration status is not applicable at the MBR level. MBRs are sometimes referred to as expired when all services within the MBR happen to be expired. |
| Expired | Service | Recurring services with expiration dates are considered expired once the full day of the expiration has passed. If the expiration date plus permanent service level extension and temporary MBR extension days have passed then recurring services are considered expired past grace. Once expired past grace RADIUS authentication begins to fail with reason "user expired" and external systems provisioned from Emerald may begin to temporarily prevent user from accessing services.<br><br>Nonrecurring services with expiration dates are considered expired once the expiration date and time have passed. Unlike recurring service the expiration is a specific point in time and does not include full day. Service and MBR level extensions do not apply to nonrecurring services.<br><br>The typical cause of service expiration for recurring service is failure to pay outstanding invoice for continuing service. It may also come about due to lapse of invoicing services. Normally it is recommended invoicing task be enabled in the scheduler menu of Emerald Administrator to allow pending invoices for continuing service to be created on a daily basis. |

| | | |
|---|---|---|
| Canceled | MBR | Canceled MBR indicates all otherwise active recurring services of the MBR are to be closed once configured full day of cancel date has passed. Recurring services continue to be usable and invoicing continues up thru full day of the cancel date.<br><br>Generally once an MBR has been closed with permanent cancellation reason Emerald automatically inactivates the MBR after all outstanding balances have been resolved.<br><br>Concept of cancellation applies only to recurring MBRs. Nonrecurring MBRs may not be closed and do not have cancel dates. |
| Canceled | Service | Recurring services are considered canceled once minimum of MBR and service cancel date has been reached. Services with cancel dates continue to be usable and continue to invoice up thru full day of cancel date.<br><br>Depending on close prorate settings configured at the service type level it is possible for service expiration date to exceed cancellation date. This occurs when a refund is not offered for partial and or full month usage. In this case even though the cancellation date has passed service remains usable up thru the expiration date. Normal permanent and temporary extensions do not apply in this case.<br><br>Only recurring services may be canceled. |
| Inactive | MBR | Inactivating an MBR frees up MBR license, prevents all further invoicing, CC/EFT transaction processing and related activity including manual invoice creation within the MBR. Additionally RADIUS authentication and most external systems provisioned from Emerald are signaled to permanently deprovision all of the MBR services.<br><br>Generally an MBR is inactivated only after any outstanding balances are settled and it will no longer be needed. If the account holder wishes to temporarily suspend service the MBR should be closed with a temporary reason rather than inactivated.<br><br>It is recommended when customers cancel service the MBR is closed using "Close MBR" menu option rather than setting MBR active status to Inactive. Closing the MBR will allow for any outstanding balances to be collected after which Emerald automatically transitions the MBR from closed to inactive. |
| Inactive | Service | When a service is inactivated all further recurring invoicing activity related to the service is suspended, RADIUS authentication disabled and service is permanently deprovisioned within most external systems. |

## Account Timeline

Changes to MBRs and services over time such as closing or suspending MBR, service upgrade or downgrade and re-opening service are recorded to the accounts timeline offering operators an overview of service affecting changes applied to customer account over time.




An accounts timeline may be modified at MBR level affecting all services within MBR or restricted to one or more services of the MBR. In example above MBR is closed during the time of service upgrade. Since MBR is closed the upgraded service shall also remain in a closed state until the MBR is later re-opened following MBR and service hierarchy.

Timeline is used authoritatively during invoicing reflecting all relevant account changes over time in the generated invoice. If a timeline modification includes periods for which invoicing has already occurred a warning message is displayed and operators are given opportunity to automatically re-invoice. Re-invoice process aligns invoices to become consistent with new modifications to the timeline by voiding incorrect invoices and replacing them with corrected versions consistent with current timeline.

## Access Times

While role of this field is unique to each configuration item the field is used to specify range of calendar days and time of day using natural language form with the following limitations.

- Year should not be specified. All ranges apply to any year
- MMDD - MMDD pattern may be used only once per time range (Jan 1 - Feb 1)
- English is currently only supported language
- Month names must be spelled out (Jan or January…)
- Time of day must use format HH:MM (3:00 or 3:00 AM)

Examples of valid time ranges can be found below.

| Example | Comments |
|---|---|
| Dec 24,25 | Months may be abbreviated. |
| Feburary 28 | Common misspellings are supported. |
| Last Monday of May | First, 1st, second, 2nd, third, 3rd, fourth, 4th and last can be used to describe week of month. |

| | |
|---|---|
| Dec 10 thru Feb 15 | Date and time automatically wraps around day, week, month and year boundaries. |
| May, June, July 1 thru 20 | Covers the 1st thru 20th of the months of May, June and July. |
| Sep-May Mon-Fri 8:00 AM - 5:00 PM | Range of time of day, month and days of week can be specified concurrently. |
| Jan - Feb, March, April, May - Oct, Nov, Dec  Mon thru Wednesday, Thursday and Fr | Multiple ranges are allowed for month, month day and day of week.  Only one range is supported for time of day or MMDD - MMDD pattern is used like the "Dec 10 thru Feb 15" example above. |
| 1:00 thru 22:00 | Without specifying 'AM' or 'PM' military time is assumed. |
| 10:00 PM to 7:00 AM | Wrap around time of day. |
| 5 | 5th day of any month. |
| 1 2 3 4 5-8, 9, 10 | 1st thru 10th day of any month. |
| M-F 9:00 AM - 5:00 PM | Covers 9:00 AM thru 5:00 PM for weekdays Monday thru Friday. |

Examples of invalid incorrectly formatted time ranges can be found below.

| Invalid Time Range | Reason |
|---|---|
| 9AM - 10PM | Time of day not in HH:MM format and space required before AM/PM. |
| 1/1 thru 3/20 | Month name is required. |
| Jan 1 - Jan 10, Feb 5 - Feb 15 | Only one MMDD - MMDD range pattern is allowed. |
| 1:00 AM - 7:00 AM, 8:00 PM - 11:00 PM. | Only one time of day range pattern is allowed. |
| Jan 1 2017 - Jan 1 2018 | Year not allowed. |

## Billing Cycles

Job of the billing cycles selected at MBR level is control of invoicing policy including whether and when to create new invoices for continuing service, manage aspects of service proration and whether services are to have expiration dates or be limited by MBR level credit limit.

Billing cycles do not control term over which services are to be invoiced such as monthly, quarterly or yearly invoicing.  This aspect is handled separately by pay periods configured at service level.  Following billing cycles are included with Emerald by default.  Billing cycles are managed from Emerald Admin / Accounting / Billing Cycle. Configuration and availability of billing cycles available to you may vary from table below.

| Billing Cycle | Description |
|---|---|
| Anniversary / Renewal | • Billing day is based on starting date of MBR.<br>• Services have expiration dates reflecting point in time service has been paid thru.<br>• Manual payment: Invoice for next service created 16 days in advance<br>• CC/EFT auto pay: Invoice for next service created 5 days in advance<br>• Automatic recurring invoicing |
| Monthly / Renewal | • Billing day is 1st of the month. |

| | |
|---|---|
| | • Services have expiration dates reflecting point in time service has been paid thru.<br>• Manual payment: Invoice for next service created 16 days in advance<br>• CC/EFT auto pay: Invoice for next service created 5 days in advance<br>• Automatic recurring invoicing |
| Calendar / Renewal | • Billing day is 1st of the month<br>• Billing month also prorated to align with calendar year for services having pay periods that are factors of 12. (e.g. 12, 6, 4, 3, 2 months)<br>• Services have expiration dates reflecting point in time service has been paid thru.<br>• Manual payment: Invoice for next service created 16 days in advance<br>• CC/EFT auto pay: Invoice for next service created 5 days in advance<br>• Automatic recurring invoicing |
| Anniversary / Balance Forward | • Billing day is based on starting date of MBR.<br>• Services have no expiration date and never expire regardless of payment status of invoice.<br>• Manual payment: Invoice for next service created 16 days in advance<br>• CC/EFT auto pay: Invoice for next service created 5 days in advance<br>• Automatic recurring invoicing |
| Monthly / Balance Forward | • Billing day is 1st of the month<br>• Services have no expiration date and never expire regardless of payment status of invoice.<br>• Manual payment: Invoice for next service created 16 days in advance<br>• CC/EFT auto pay: Invoice for next service created 5 days in advance<br>• Automatic recurring invoicing |
| Calendar / Balance Forward | • Billing day is 1st of the month<br>• Billing month also prorated to align with calendar year for services having pay periods that are factors of 12. (e.g. 12, 6, 4, 3, 2 months)<br>• Services have no expiration date and never expire regardless of payment status of invoice.<br>• Manual payment: Invoice for next service created 16 days in advance<br>• CC/EFT auto pay: Invoice for next service created 5 days in advance<br>• Automatic recurring invoicing |
| Non-Recurring | • No proration<br>• No automatic invoicing. Services are invoiced on demand as explicitly requested by operator POS invoicing and customer directed purchases from customer account center.<br>• Service expiry, time and data allocations based on invoiced time & data charges. |

More detail related to each available billing mode is described in the table below.

| Billing Mode | Description |
|---|---|
| Renewal | Renewal billing cycles operate on a subscription basis where:<br><br>• Customer is invoiced in advance for their next term of service.<br>• As each term is paid service expiration date is advanced to match period customer has paid thru.<br><br>In the event customer does not pay prior to service expiration service is considered expired and access via RADIUS authentication and external system provisioning is restricted. Additionally |

| | |
|---|---|
| | no further invoicing for future terms takes place until current invoice is paid.<br><br>Recurring grace period configured at the service level and temporary grace period configured within MBR work together allowing an expired service to continue to be usable for some time after expiration date has passed affording customers some additional flexibility in payment before services are disabled.<br><br>When a customer has not paid for an extended period of time the Emerald Admin accounting setting "MBR Expired Automatic Close After" enables MBRs to be automatically closed without operator intervention.<br><br>Renewal billing cycles are generally used in residential environments offering advantage of not allowing customers to run up debt or requiring operator intervention to cancel service in the event customer has decided to stop paying for service.<br><br>Optional Email and SMS notifications can be configured to alert customers to pending expiration.<br><br>In this mode MBRs consume an MBR license so long as MBR is set "Active" regardless of presence or status of services. |
| Balance Forward | Similar to renewal balance forward MBRs also invoice on a prepaid recurring basis with following notable differences:<br><br>• Services have no expiration date and therefore never expire<br>• Services are always invoiced for next term regardless of whether invoice for previous term was paid.<br><br>Balance forward billing cycles are typically used for businesses and large customers where it may not be desirable to have services automatically turned off or invoicing cease in the event of non-payment. This billing cycle carries burden of requiring operators to set a credit limit on per-MBR basis and or regularly monitor aging reports to manage liability and contact customers to arrange payment.<br><br>In this mode MBRs consume an MBR license so long as MBR is set "Active" regardless of presence or status of services. |
| Non Recurring | This mode disables all automatic recurring billing for the MBR. When used customer and or operator must explicitly purchase and fully pay for service before it is granted. In this mode expiration field is used to determine account expiration.<br><br>Non-recurring billing is useful for providing pre-paid "Pay-As-You-Go" service and one-time accounts for wireless hotspots.<br><br>Licensing is counted differently from renewal and balance forward cycle types for non-recurring MBRs. For non-recurring MBRs license is consumed for an active MBR only when there are one or more services having not yet expired. |

Four billing cycle configuration examples are shown below. Each example assumes a service starting date of Feb 18th.

| # | MBR Billing Cycle | Service Pay Period | Service Billing Day | Service Invoicing | Proration |
|---|---|---|---|---|---|
| 1 | Monthly | Monthly | 1st of each Month | Feb 18 to Feb 28<br>March 1 to March 31 | Feb 18 to Feb 28 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | April 1 to April 30<br>May 1 to May 31<br>June 1 to June 30 | |
| 2 | Anniversary | Monthly | Match service Start day of month ($18^{th}$ of each month) | Feb 18 to April 17<br>May 18 to June 17<br>June 18 to July 17<br>Aug 18 to Sep 17 | None |
| 3 | Monthly | Quarterly | $1^{st}$ of each 3-month period | Feb 18 to Feb 28<br>March 1 to May 30<br>June 1 to Aug 31<br>Sep 1 to Nov 30 | Feb 18 to Feb 28 |
| 4 | Calendar | Quarterly | $1^{st}$ of each calendar Quarter | Feb 18 to March 31<br>April 1 to June 30<br>July 1 to September 30<br>October 1 to December 31 | Feb 18 to March 31 |

1) Shows a service that would be billed once a month on the $1^{st}$ of each month.

2) Billing period for an anniversary billing cycle with a monthly pay period would start monthly on anniversary of service start date. A service with a Feb $18^{th}$ start date billing periods would begin on March $18^{th}$, April $18^{th}$ and so on.

3) Service with monthly billing cycle and a quarterly pay period would have a billing period that would start on the $1^{st}$ of each subsequent three month billing period (Mar $1^{st}$, June $1^{st}$, Sep $1^{st}$ and Dec $1^{st}$)

4) Presents the same billing configuration as example 3, except aligned to standard calendar quarters (Apr $1^{st}$, July $1^{st}$, Oct $1^{st}$, Jan $1^{st}$).

## Date Fields

Important billing related date fields described below are displayed and managed within each MBR.

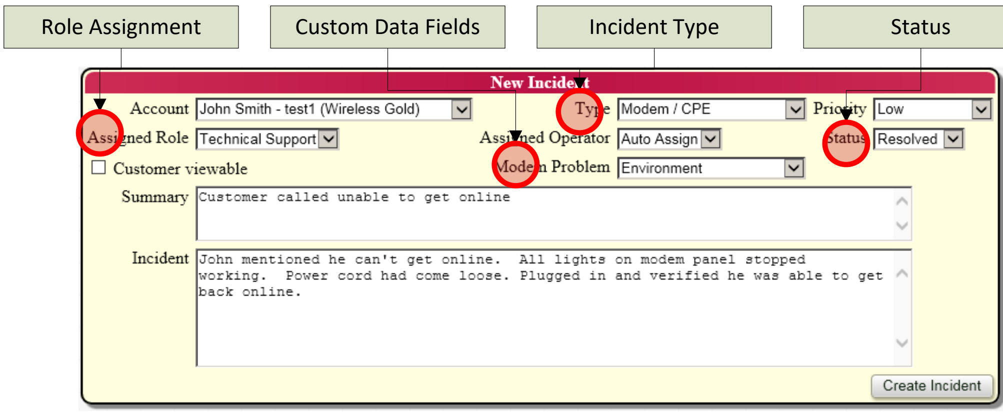
| Field | Bill Mode | Description |
|---|---|---|
| Billed Thru | Recurring | Service billed thru date represents the full day thru which a service has been invoiced for continuing service. Billed thru is normally advanced automatically as new recurring invoices are generated and rolled back to prior date should a recurring invoice be voided.<br><br>Service Billed thru date determines the starting date of the next recurring invoice for continuing service.<br><br>It is recommended operators avoid any manual changes to Billed thru date. Manual advancement may result in customer receiving free service for the difference between initial and new billed thru date. Manually setting billed thru back in time can result in the customer being double billed for service having previously been invoiced.<br><br>Rather than changing billed thru it is recommend changes be made to account timeline and reinvoiced as necessary to apply desired change. |
| Billed Thru | Nonrecurring | Billed thru date is not used in conjunction with nonrecurring services and should be ignored. Billed thru date field is displayed and advanced during payment of |

| | | |
|---|---|---|
| | | one-time charges in order to facilitate possibility of service being made recurring. |
| Expire Date | Recurring | Service expiration date reflects full day thru which service has been both invoiced and paid. Expiration date is automatically advanced as existing recurring invoice line items are paid.<br><br>MBRs with balance forward billing cycles have no expiration date and do not expire.<br><br>Once expiration date has passed RADIUS authentication and many external systems may disable access to services once the expiration date plus combined temporary MBR level extension and service level recurring extension are exceeded. For example if service expiration date is Jul 20 and service level recurring extension is 5 days and MBR level temporary extension 2 days then the effective expiration date is Jul 27. This means starting Jul 28 access to services is disabled until payment is received and expiration advanced.<br><br>When MBR or service is canceled and service expiration date is equal or greater than cancellation date the permanent and temporary extension fields are ignored and do not contribute to the effective expiration date. |
| Expire Date | Nonrecurring | Service expiration reflects point in time service has been invoiced and paid thru. Non-recurring service expiration differs from recurring expiration in following ways:<br><br>• MBR and service level extensions are not applicable<br>• Expiration includes a specific time of day after which service is considered expired. |
| Cancel Date | Recurring | Cancel date represents last full day after which MBR and or service is considered to be closed. Services continue to be usable and will continue to be invoiced until full day of cancellation date has passed.<br><br>After cancel date services are no longer invoiced for recurring service unless re-opened in the future.<br><br>If both MBR and service are canceled then earlier of both dates becomes the effective cancellation date of service.<br><br>In some cases service expiration date may exceed the cancellation date. In this case services including RADIUS and external systems will continue to be usable until the full day of the service expiration has passed. Most common reason for service expiration exceeding cancel date is prorate close service type level configuration where customers may only be credited for completely unused months or not credited at all. |
| Cancel Date | Nonrecurring | Cancel date is not applicable to non-recurring service. Nonrecurring services are always invoiced manually. |
| Open Date | Recurring | Starting date at the beginning of which service is to be provided and invoicing is to begin. Open date can be set to indicate a starting date of when a new service is to begin invoicing or when an existing service having been previously closed is to resume.<br><br>If services open date has not yet been reached RADIUS authentication fails with reason of start date not reached. |
| Open Date | Nonrecurring | Open date is not applicable to non-recurring service. Nonrecurring services are invoiced manually. |
| Billing Day | Recurring | Determines anniversary day of the month future recurring invoice are to be aligned |

| | | |
|---|---|---|
| | | such that starting day of next invoice term matches billing day.<br><br>For example assuming billing day is 10 representing 10th day of the month and service is invoiced monthly then normally start of invoiced term falls on the 10th of the month ending after full day of the 9th of following month. (e.g. Feb 10th thru March 9)<br><br>Should service billed thru date be unaligned with billing day services are automatically prorated based on service type prorate configuration to re-align future invoicing periods with billing day. When aligned billing day will normally appear to be a full day greater than current billed thru day of the service.<br><br>Continuing with example above where billing day is the 10th of the month assume a service is currently billed thru Feb 9th. This means service has currently been invoiced for the full day of Feb 9th. When next invoiced the term shall be full day of Feb 10th thru full day of March 9th.<br><br>If billing day were changed to be greater than or less than 10th a prorate invoice would be generated such that ending date of invoice term and resulting billed thru date of the service after proration is a day less than billing day.<br><br>Billing day is only available for configuration at the MBR level when MBR is configured with an anniversary billing cycle. Otherwise for monthly billing cycles billing day is configured within the billing cycle itself.<br><br>Billing days exceeding last day of the month are interpreted as the last day of the month.<br><br>Billing day is ignored by recurring services having a pay period defined in units of days rather than months. |
| Billing Day | Nonrecurring | Not applicable for non-recurring service. |

## Incidents

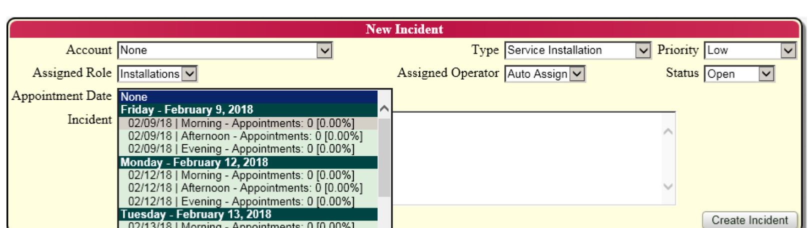
Incidents within Emerald are synonymous with "case", "support ticket" or "trouble report" in other systems. Incidents offer means of tracking customer related issues and documenting customer service interaction over time including technical issues, inquiries, sales, appointment scheduling, outages and recording progress of projects.



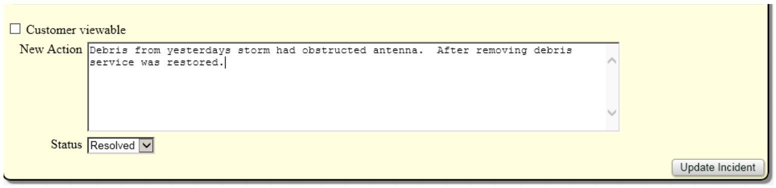

In illustration above a customer has called into support line to report trouble with their access service. A new incident is added from within customer MBR in order to document customer interaction. The following fields are configured.

| Field | Description |
|---|---|
| Incident Type | When creating a new incident first select incident type best describing nature of the customer request. Once a type is selected assignment defaults, available incident states ("Status" field) and displayed data fields are automatically changed to support the chosen incident type.<br><br>Common examples of incident types include:<br>• Technical support<br>• Billing questions<br>• Account changes<br>• Service installation<br>• Service repair<br><br>Incident types are managed from Emerald Admin / Incidents & Schedules menu. |
| Role Assignment | Assigned Role determines the operator role (group of operators) the incident is to be assigned to for resolution by a member of that group. Role assignment determines the pool from which operator assignment is to be performed as well as managing escalation.<br><br>Normally role assignment is automatic based on incident type however it can be overridden by operators as required. |
| Status | Reflects the current disposition of this incident. Available status options are configurable and may vary by incident type. In this example the customer's problem was solved so status was set "Resolved". Leaving status "Open" indicates more work is required and may result in email reminders being sent over time or the incident being escalated to other operators when not resolved within configured limits of due date or incident type. |
| Custom Data Fields | In this example selection of Modem / CPE incident type resulted in a custom data field "Modem Problem" displayed to collect more information specific to the chosen incident type. |

To schedule an appointment using incidents select incident type corresponding with nature of appointment to be scheduled.



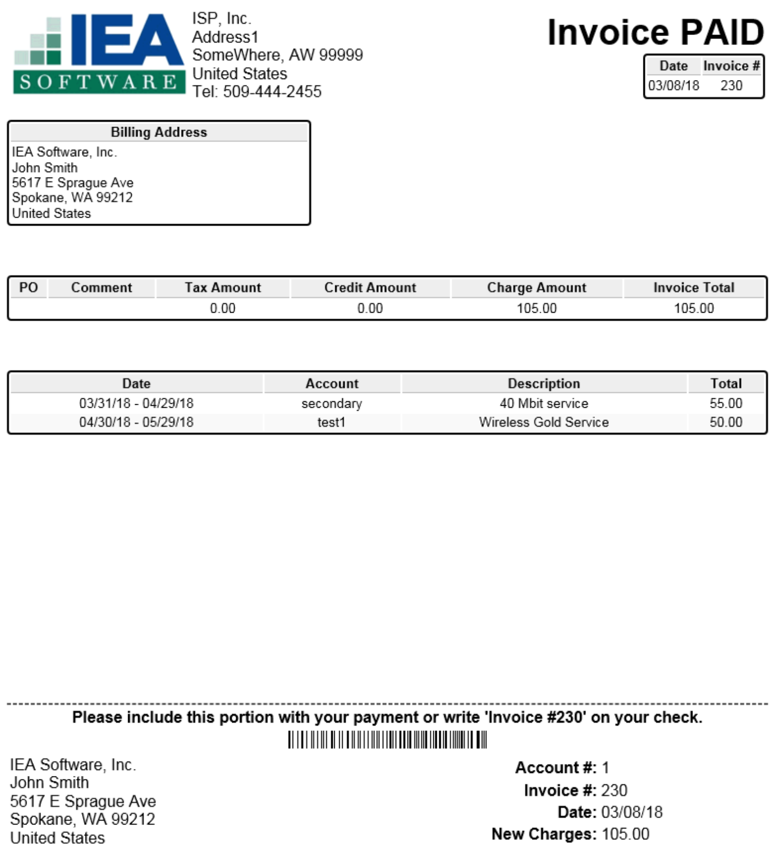
"Appointment Date" field provides a view of available time slots and scheduling availability to assist in selecting best available appointment date and time for the customer. Appointments otherwise are managed similarly to incidents. Infobar notifications, operator dashboards, reports and notices are available to provide both global and operator specific appointment notification and calendars of pending appointments.




Once an incident is created details of follow up actions subsequently taken to resolve or update status of an open incident are added to existing incident as actions. Instead of amending text of original incident additional information is added as an action to the existing incident. This allows for a historical record of steps and status updates over time necessary for resolution. If an incident is marked as customer viewable then checking customer viewable box when adding an action enables users to view the details of action entered from assistance request feature within customer account center. If customer viewable is not checked or option itself is not visible the text of action is not made available via customer account center. Actions are not editable and cannot be deleted after having been recorded.

## Invoices

Invoices provide customers with a bill of new charges and credit adjustments. Invoices do not offer any information related to payments or account balance. Creation of new invoices in Emerald generally occurs automatically based on MBR configuration and associated administrative policy.


ISP, Inc.
Address1
SomeWhere, AW 99999
United States
Tel: 509-444-2455

**Invoice PAID**

| Date | Invoice # |
|---|---|
| 03/08/18 | 230 |

| Billing Address |
|---|
| IEA Software, Inc.<br>John Smith<br>5617 E Sprague Ave<br>Spokane, WA 99212<br>United States |

| PO | Comment | Tax Amount | Credit Amount | Charge Amount | Invoice Total |
|---|---|---|---|---|---|
| | | 0.00 | 0.00 | 105.00 | 105.00 |

| Date | Account | Description | Total |
|---|---|---|---|
| 03/31/18 - 04/29/18 | secondary | 40 Mbit service | 55.00 |
| 04/30/18 - 05/29/18 | test1 | Wireless Gold Service | 50.00 |

Please include this portion with your payment or write 'Invoice #230' on your check.

IEA Software, Inc.
John Smith
5617 E Sprague Ave
Spokane, WA 99212
United States

**Account #:** 1
**Invoice #:** 230
**Date:** 03/08/18
**New Charges:** 105.00

Invoices may be printed for postal delivery to customers or sent electronically via email.

Format and presentation of invoices can be customized via "Invoice report" field visibility settings, by billing group configuration as well as customization of invoice reports.

It is generally recommended most residential customers be sent statements rather than invoices. Statements provide all detail found within invoices plus list of received payments, account balance and aging information. To minimize confusion it is recommended either invoices or statements be sent to customers not both.

Table below describes available invoice types and circumstances for each.

| Invoice Type | Description |
| --- | --- |
| Renewal or CC | Renewal and Credit Card invoices are generated automatically based on MBR billing cycle in order to invoice recurring services for upcoming billing period. Unapplied credit and charge adjustments present at time of invoice creation are also rolled into Renewal and Credit Card invoices. |
| Interim | An interim invoice consists of currently unapplied credits and charge adjustments such as consulting, late payment or usage fees. Interim invoices are triggered when a new recurring invoice is not expected to be generated automatically within the next month based on Emerald Admin / Accounting / Settings / Interim Look-Ahead.<br><br>A typical example of where an Interim invoice would be generated is a customer who pays on a yearly basis for base Internet service yet is also billed for any data consumption overages occurring within a given billing month. Since invoice for next year of service is still several months away an interim invoice is generated to reflect consumption overage fees.<br><br>Some charge adjustments such as certain late fees and payment transaction fees are configured such that they never by themselves trigger creation of interim invoices however should an interim invoice be triggered by different unapplied charges then these fees are attached to the resulting interim invoice regardless of whether they are allowed to trigger interim invoicing. |
| Reseller | Reseller invoices are generated to charge resellers for accounts their customers have used over the previous months period. Reseller pricing is configured from Emerald Admin / Resellers / Service Pricing menu and level of detail of reseller invoices is managed from Emerald Admin / Resellers / Organizations. |
| Point of Sale | Point of Sale invoices are generated on demand via the Point of Sale MBR menu option and may only contain line items generated from this menu. Neither unapplied charges nor line items for recurring services may be rolled into a POS invoice.<br><br>Total unpaid amount of POS invoices do not contribute to amounts automatically charged to the customer's account when MBR is configured for automatic CC/EFT processing. POS invoices must be paid manually or a payment plan must be assigned to the MBR specifying schedule on which payment is to be applied. |

## Market Tags

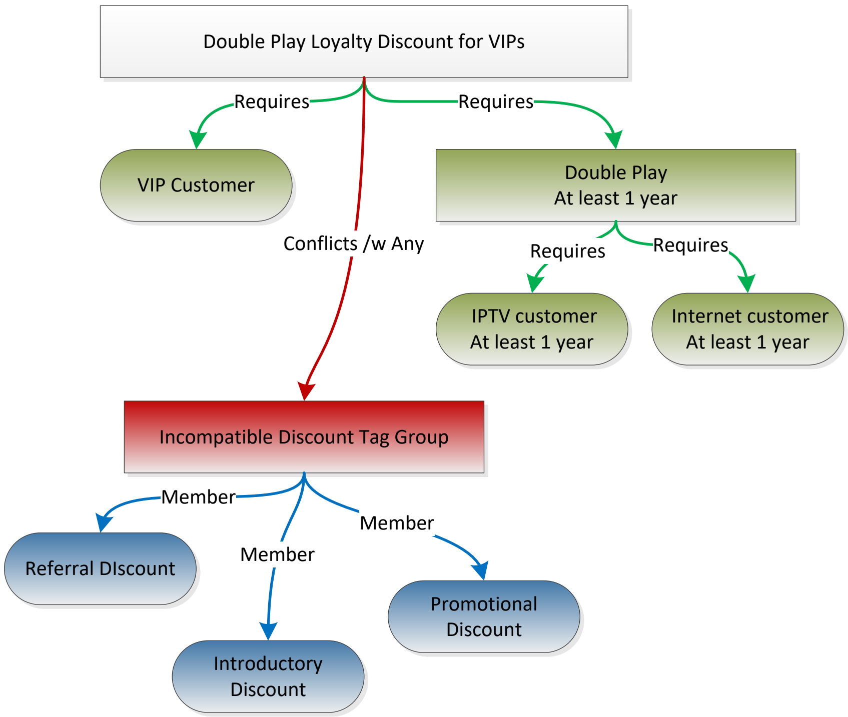
Market tags provide basis for discounting and pricing customization throughout Emerald. At most basic level tags represent facts about MBRs and services. Facts can be organized by administrative configuration into increasingly complex rules supporting product pricing, marketing, and customer loyalty needs.

When managing accounts two basic types of market tags exist:

- Manual tags represent a menu of facts operators manually toggle on or off within MBRs and Services as appropriate. Common examples of manual market tags: VIP, Employee, Business Customer, Senior and Educator.
- Automatic tags are activated in response to specific configuration within an account. For example a yearly pay period discount tag is automatically activated whenever a recurring service is configured with a yearly pay period.

The following example offers illustration of different market tags working together to define discounting policy. In this example customer receives a loyalty discount on future invoices after having been invoiced for Internet and

Video service for 1 year or more.  In order to qualify for this discount the customer must also be considered a VIP and not currently receive referral, introductory or promotional discounts.




While pricing and discounting policy can require complex configuration within Emerald administrator all processing of market tags managed within Emerald client is fully automated.   In the example above the only configuration required on an MBR basis is to indicate the customer is a VIP by activating 'VIP' market tag.   Should at some point in the future one or more conditions of the tag no longer be met then associated discounting is automatically discontinued.  In this example if customer were to drop Video service then associated double play loyalty discounting is automatically discontinued.

## Pay Periods

Pay period is assigned to each service within an MBR to define length of invoiced term for recurring service in units of days or months.  Examples of pay periods include weekly, monthly, quarterly, six months and yearly.

While invoicing month based pay periods proration may occur in order to align billing day of service with MBRs billing day per configured billing cycle and service type level prorate policy.  No proration is performed while invoicing pay periods defined in units of days regardless of billing cycle.  For prorated line items and day based pay periods cost is generally calculated as 1/30th monthly rate regardless of the month invoicing occurs.  Prorates exactly spanning a billing month of 28, 29 and 31 days are costed as 1/28th, 1/29th and 1/31st the monthly rate.

Pay periods while required for all services are ignored and unused by nonrecurring services.

Discounting is often influenced by pay period selection where customers may receive percentage discounts on recurring invoice when they decide to allow invoicing over longer terms such as every six months or yearly.

## Pay Methods

The payment method chosen for each recurring MBR controls whether outstanding MBR balance is to be paid automatically.

| Pay Method | Description |
|---|---|
| Renewal | Specifies outstanding balance requires customer to submit payment by any means available including making a one-time credit card payment from customer account center. Selecting renewal pay method does not preclude the manual use of Credit Card and EFT transactions. |
| Credit Card | Specifies outstanding balance from non-POS invoices is to be paid by credit card in automated fashion normally requiring no customer or operator intervention.<br><br>When Credit Card pay method is selected at the MBR level the credit card to be used for automatic transactions must be assigned by following credit card hyperlink from account status menu of MBR.<br><br>Auto pay does not apply to POS invoices. POS invoices must be paid manually by an operator or customer from customer account center.<br><br>When an MBR is configured for Credit Card auto pay it is recommended operators not attempt to manually create Credit Card transactions from the Make Payment menu of the MBR unless paying a POS invoice. Instead use "Process Transactions" option within Payments menu of MBR to process any outstanding transactions right away. |
| Bank Transfer | Specifies outstanding balance from non-POS invoices is to be paid by EFT in automated fashion normally requiring no customer or operator intervention.<br><br>When Bank Transfer pay method is selected at the MBR level banking information to be used for automatic transactions must be assigned to the MBR.<br><br>Auto pay does not apply to POS invoices. POS invoices must be paid manually by an operator or customer from customer account center.<br><br>When an MBR is configured for Bank Transfer auto pay it is recommended operators not attempt to manually create EFT transactions from the Make Payment menu of the MBR unless paying a POS invoice. Instead use "Process Transactions" option within Payments menu of MBR to process any outstanding transactions right away. |

## Payment Types

While applying payment to an MBR Emerald accepts following payment types.

| Pay Method | Description |
|---|---|
| Cash | Once created cash payment may be dishonored or modified only once. |
| Check | When entering check payments check sequence number is mandatory.<br><br>If using Emerald Client / Billing / Post Payments feature and payment of same amount and check number as one or more payments previously posted the MBR are recorded a possible duplicate warning message is displayed. |

| | |
|---|---|
| | Once created a check payment may be dishonored or modified only once. |
| Credit Card | Credit Card processing requires one or more credit card batch processors to be setup to handle processing of card transactions.<br><br>Once a credit card transaction has been submitted it may be voided until either the transaction is settled or "Allow CC/EFT New Payment Void (Hours)" has passed. Once a transaction can no longer be voided then a single credit may be issued against the payment to refund part or all of the payment to the customers card account.<br><br>Credit card transactions cannot be dishonored. |
| Bank Transfer | EFT processing requires one or more EFT batch processors to be setup to handle processing of EFT transactions.<br><br>Prior to making an EFT payment bank information must be entered by following EFT link in Account Status display of the MBR.<br><br>EFT transactions do not guarantee/block funds in real-time as with credit card transactions. A period of two or more days is typically required for EFT transactions to complete however payment is applied to the account immediately regardless of ultimate status of the EFT transaction.<br><br>In the event an EFT transaction ultimately fails to transfer funds from customer account due to insufficient funds or an invalid routing or account number you will be notified by your bank separately. Upon notification the payment should be dishonored from the Payments menu of the customer MBR.<br><br>An EFT payment may be dishonored or a single credit issued against payment to refund part or all of the payment to the customer's bank account. |
| Pre-Paid Card | If prepaid cards are available full or partial amount of remaining balance on the card may be applied as a payment. Once any amount is taken from a card it may no longer be claimed for "direct use". |
| *** User Defined | All user defined payment types operate similar to cash and may be dishonored or modified only once. |

## Send Methods

Send methods are selected on a per-MBR basis determining means by which invoices and statements are distributed to customers including following administratively configured considerations:

- Whether invoices and statements are printed for postal delivery and or emailed
- Format of emailed invoices and statements (e.g. HTML or PDF). PDF formatting requires crystal reports otherwise delivery is via HTML when PDF is selected yet crystal reports unavailable.
- Assessment of delivery fees.
- Whether postal or email delivery should occur while MBRs is configured for CC/EFT auto pay.

In addition to send method selection General / Billing Group and Accounting / Settings administrative menus offer options to customize statement report rendering and manage whether postal delivery should occur for MBRs having 0 or credit balance.

## Search Fields

Following tips can be used in search forms throughout Emerald.

When an input field is not empty contents of the field are used to filter search results to only those records matching ALL non-empty fields. For example entering "John" into first name field and "Smith" into last name field results in displaying items related to the customer "John Smith" but not "John Rigel" or "Phoebe Smith"

Many alphanumeric search fields utilize a "starts with" match by default. Entering "Jo" into first name search field results in displaying items related to customers "John", "Joan" and "Joshuah". The "starts with" matching can be changed to a "substring" match by entering character % prior to search term. For example entering "%Jo" into first name field matches names "John", "Bjorn", "Alejo" and "Hajo". "Substring" matching operations are generally slower and more resource intensive to complete than "starts with".

Character classes can also be used to customize searches. For example to search all service logins beginning with "aurora" followed by two numbers such as "aurora11" or "aurora23" enter "aurora[0-9][0-9]" into login search field.

Most search forms throughout Emerald can be customized to display only those fields and columns of search results relevant to you by customizing field visibility from Emerald Client / Options / Field Visibility for locations ending in "search". Not all available fields are enabled by default in search forms. Some must be explicitly enabled within field visibility settings.

Number of rows returned in response to a specific search form is limited by "Operator Limits" configuration within Emerald Admin / Web Interface menu.

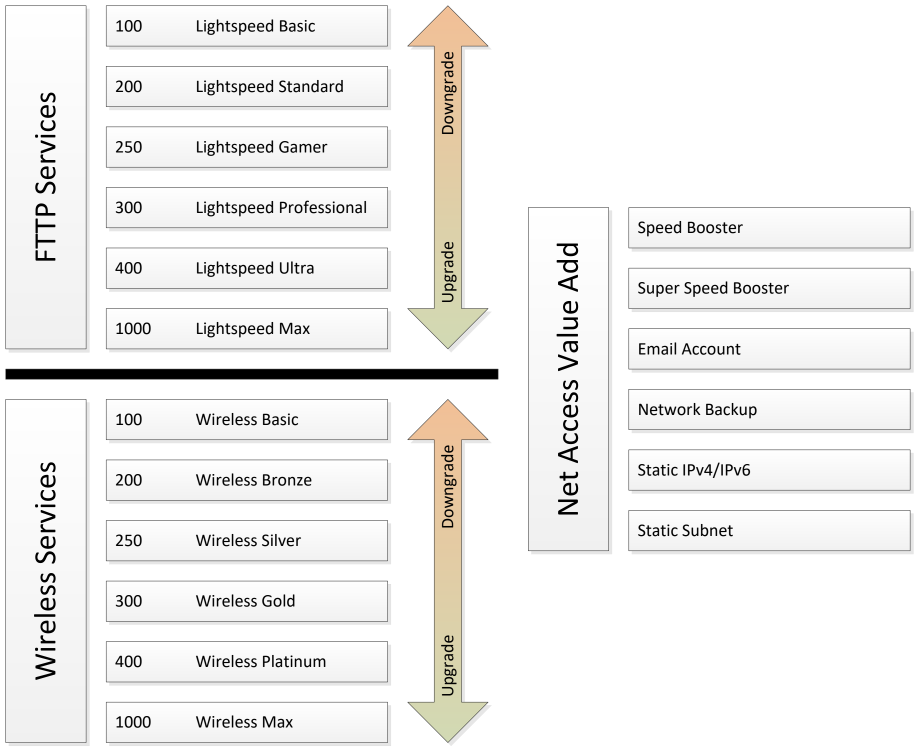
## Service Types

Service types determine what is to be provisioned on behalf of customer in exchange for recurring or one-time fee while assigning a service to the MBR. Examples of service types include DSL Standard, Wireless Gold, Fiber Silver, Email, Hosting, Backup 2 TB and Static IP. Service type determines service affecting aspects including:

- Base monthly or one-time, setup costs and taxation
- Recurring time and data limits
- Postpaid usage based fees
- RADIUS authentication and authorization properties
- External system provisioning
- Service templates
- Service monitoring

## Service Categories

Service categories organize service types into common groupings of related services. In the illustration below service categories "FTTP Services" and "Wireless Services" each contain six service types representing available service levels by access technology (FTTP and Wireless).




When adding new services to an MBR service category is first chosen. Based on service category selection available service types within the service category are presented. Once a service has been created the chosen service category is fixed for the lifetime of that service. Service category is generally is not possible to change unless other service categories with fully compatible service configurations exist.

Once a service is created service may be upgraded or downgraded by changing service type to a higher or lower service level contained within service category. In the above example wireless "Wireless Services" / "Wireless Silver" has a service level of 250. Service types with higher service level are considered upgrades while selecting service type with lower service level is considered a downgrade. Ability for customers to upgrade or downgrade service is managed within service category configuration of Emerald Administrator.

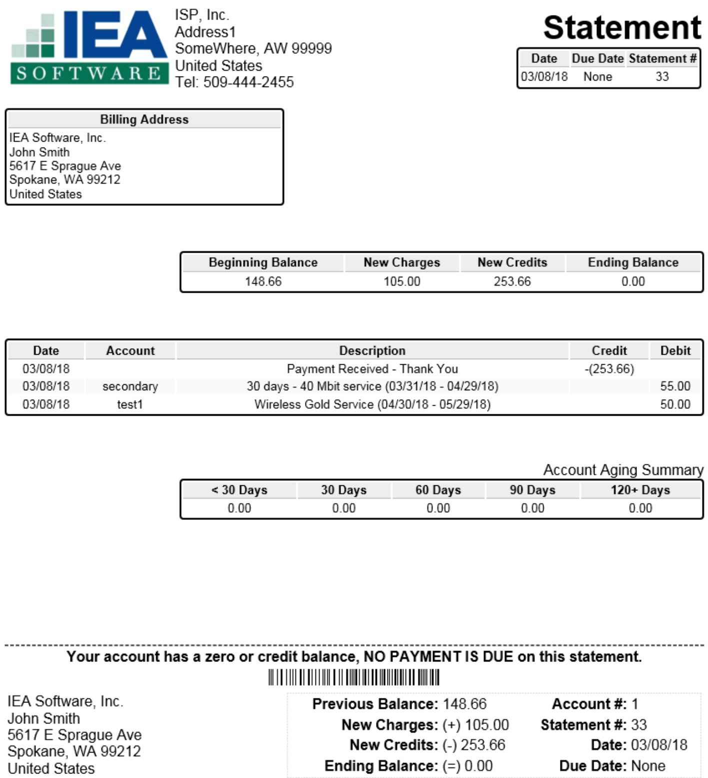
Beyond determining service type availability service categories enable child services to enhance or modify parent service. Following illustration above a child service may be added under primary Wireless or FTTP services using "Net Access Value Add" service category to add speed-booster or static address as an add-on to parent service.

## Statements

Statements provide customers with an account of all new invoicing and payment activity occurring since previous statement. Current account balance and aging at the time of statement creation are also included.

Normally statements are sent to customers on at most a monthly basis so long as new account changes exist to report. If an account has an outstanding balance new statements will continue to be sent on a monthly basis even if no new activity has occurred to remind customer of outstanding debts and provide updated aging.

Emerald Admin / Accounting / Settings "Allow Payment to Trigger new Statements" and "Minimum new statement interval (Days)" manage automatic statement creation policy. Please read the Emerald Administrators documentation on these settings carefully prior to making changes. If statements are being sent at most once a month it is recommended operators avoid manually creating one off statements from MBR statements menu.



IEA SOFTWARE

ISP, Inc.
Address1
SomeWhere, AW 99999
United States
Tel: 509-444-2455

**Statement**

| Date | Due Date | Statement # |
|---|---|---|
| 03/08/18 | None | 33 |

**Billing Address**
IEA Software, Inc.
John Smith
5617 E Sprague Ave
Spokane, WA 99212
United States

| Beginning Balance | New Charges | New Credits | Ending Balance |
|---|---|---|---|
| 148.66 | 105.00 | 253.66 | 0.00 |

| Date | Account | Description | Credit | Debit |
|---|---|---|---|---|
| 03/08/18 | | Payment Received - Thank You | -(253.66) | |
| 03/08/18 | secondary | 30 days - 40 Mbit service (03/31/18 - 04/29/18) | | 55.00 |
| 03/08/18 | test1 | Wireless Gold Service (04/30/18 - 05/29/18) | | 50.00 |

Account Aging Summary

| < 30 Days | 30 Days | 60 Days | 90 Days | 120+ Days |
|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Your account has a zero or credit balance, NO PAYMENT IS DUE on this statement.**

IEA Software, Inc.
John Smith
5617 E Sprague Ave
Spokane, WA 99212
United States

**Previous Balance:** 148.66 **Account #:** 1
**New Charges:** (+) 105.00 **Statement #:** 33
**New Credits:** (-) 253.66 **Date:** 03/08/18
**Ending Balance:** (=) 0.00 **Due Date:** None

Statements may be printed for postal delivery to customers or sent electronically via email.

Format and presentation of statements can be customized via "Statement report" field visibility settings, by billing group configuration as well as customization of statement reports.

It is generally recommended most residential customers be sent statements rather than invoices. Statements provide all detail found within invoices plus list of received payments, account balance and aging information. To minimize confusion it is recommended either invoices or statements be sent to customers not both.

# ACCOUNTS

Accounts menu facilitates search and management of existing accounts as well as creation of new MBRs.

## Simple Search

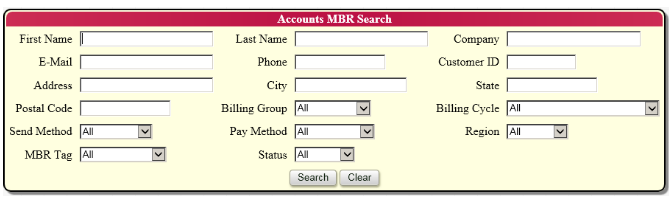
Simple search offers combined search by MBR and Service into a single search form where both MBR and Service level data are searched together.


Status field filters search results by MBR and account status. Initial default for this field is managed from "Emerald Admin" / "Web Interface" / "Operator Settings" / "Default account search status".

| Status | Description |
|---|---|
| All | MBRs and services are not filtered by account status. |
| Active | Include only active non-canceled or expired services or active non-canceled MBRs. |
| Expired | Include only expired services. |
| Canceled | Include canceled MBRs and or services. |
| Inactive | Include inactive MBRs or services. |
| Normal | Include all MBRs and services except for those having MBR or Service level active field set inactive. |

## MBR Search

Search of MBR level account information only ignoring any services within MBR.

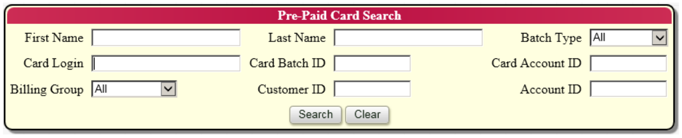



## Service Search

Search of service level account information only. Information specific to the MBR is ignored.

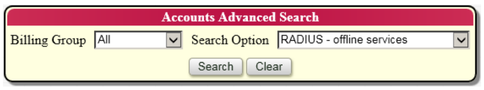

## Prepaid Search

Search prepaid cards within batches generated from Emerald Admin / Prepaid menu. Prepaid search includes all cards including those having not yet been used by any MBR or service.




## Advanced Search

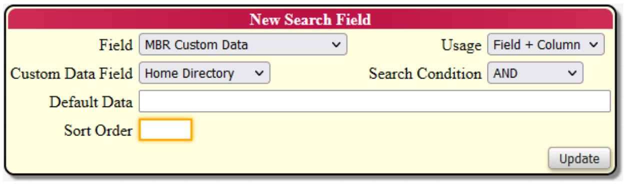
Advanced search offers a series of preconfigured searches to assist with specific tasks.




| Search Option | Description |
|---|---|
| MBRs without active services | List of active MBRs with recurring billing cycle having no active services. Often useful in closing out unused accounts to free up MBR licenses. |
| MBRs canceled over 1 year | List of active recurring MBRs having been canceled for a year or more. Generally such MBRs represent MBRs closed for a temporary reason having been abandoned and never subsequently reactivated. These MBRs may be candidates for inactivation in order to free up MBR licenses. |
| Services /w static cost | List of active where service level market tag with a static cost override is active. |
| Services /w RADIUS attributes | Active services having custom service level RADIUS attributes assigned. |
| Services /w external system failures | List of active services assigned to one or more external systems and synchronization of service status is currently in a failed state for one or more external systems. |
| Services /w send bill enabled | List of active recurring services having the legacy "send bill" field enabled indicating service email or service login @ domain should be included in any billing related messaging. |
| Services /w active ETF | List of active recurring services having one or more active market tags and still within the ETF term. These services if closed would result in assessment of ETF fees. |
| Free MBRs | List of active recurring MBRs without any recurring services having a nonzero cost. |
| Free services | Listing of active recurring services /w no monthly cost. |
| RADIUS - online services | List of services having one or more active network session based on current RADIUS accounting data. |
| RADIUS - recent auth fail services | List of active services for which RADIUS authentication has recently failed one or more times within past days. |
| Free RADIUS capable services | Listing of active recurring services /w no monthly cost for which RADIUS authentication is possible. |
| CC auto MBRs /w expired cards | Displays listing of active MBRs configured /w credit card pay method for which the credit card on file has expired. |
| CC auto MBRs without card on file | List of active recurring MBRs configured with CC pay method yet no card information is currently on file. |
| EFT auto MBRs without bank on file | List of active recurring MBRs configured with EFT pay method yet no bank information is currently on file. |
| RADIUS - offline services | Listing of active recurring RADIUS capable services where no network sessions are currently active based on current RADIUS accounting data. |

## Custom Search

Operators are able to build their own search forms from this menu customizing account lookup to meet each operator's requirements.  Once a custom search is created it is accessible with the other search forms from the Accounts sub menu of the Emerald client.




<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Field</td><td>Field to be added to the search form.  A field may be applied to the search form more than once.  Some fields such as custom data offer secondary selections to pick custom data fields.</td></tr>
<tr><td>Usage</td><td>Whether the field is to be used in search form or search results.  Not all fields offer the ability to both search and view results.<br><br>
<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>Field + Column</td><td>Field will be both presented within search forms to filter search results as well as included as a column within search results.</td></tr>
<tr><td>Search Field</td><td>Field will only appear within search form and not in any search results.</td></tr>
<tr><td>Result Column</td><td>Field will only appear in search results and not search form.</td></tr>
</table></td></tr>
<tr><td>Custom Data Field</td><td>When 'Field' is MBR or Service Custom Data this determines the custom data field to be used.</td></tr>
<tr><td>Address Custom Data</td><td>When 'Field' is Address Custom Data this determines the address custom data field to be used.</td></tr>
<tr><td>Search Condition</td><td>Determines how a search field will be combined with other search fields during account lookup.<br><br>
<table>
<tr><th>Condition</th><th>Description</th></tr>
<tr><td>AND</td><td>When set any field within the normal topmost section of the search form not blank or set 'All' restricts results to those accounts with matching all criteria.</td></tr>
<tr><td>OR …</td><td>When set all fields within an OR section under the heading 'Match one or more' not blank or set 'All' restrict results to any account matching ANY search field within the section.<br><br>If there are multiple OR sections that contain one or more fields that are not blank or set 'All' each section is ANDed together with normal attributes when searching for matching accounts.</td></tr>
</table></td></tr>
<tr><td>Default Data</td><td>Value entered into the search form by default when it is first displayed or after clear button is used.  For fields that display selection lists the data field must contain the numeric identifier at this time instead of the intended value.</td></tr>
<tr><td>Sort Order</td><td>Determines order fields appear in both search forms and search results in the order of lowest to highest.  If any fields with an OR condition are used those fields are grouped together after all AND fields.</td></tr>
</table>

## Invoice Search

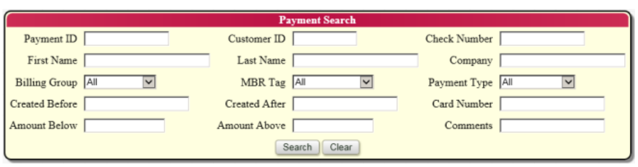
Invoice search includes estimates and voided invoices


## Statement Search

Search existing statements

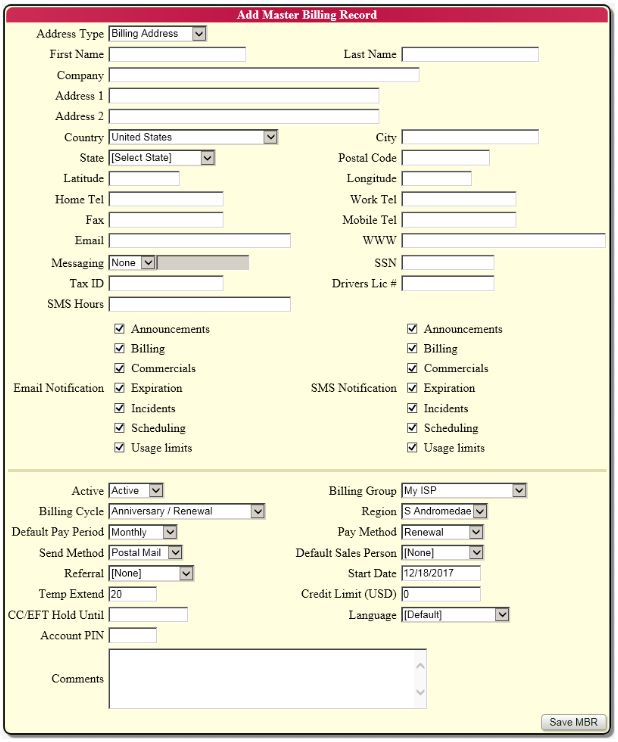

## Payment Search

Search payments including dishonored payments




## New MBR / Edit MBR

This option creates a new customer account / master billing record (MBR). Fields displayed when adding a new MBR may vary based on licensed features, address type, access controls, MBR level custom data fields and field visibility settings.



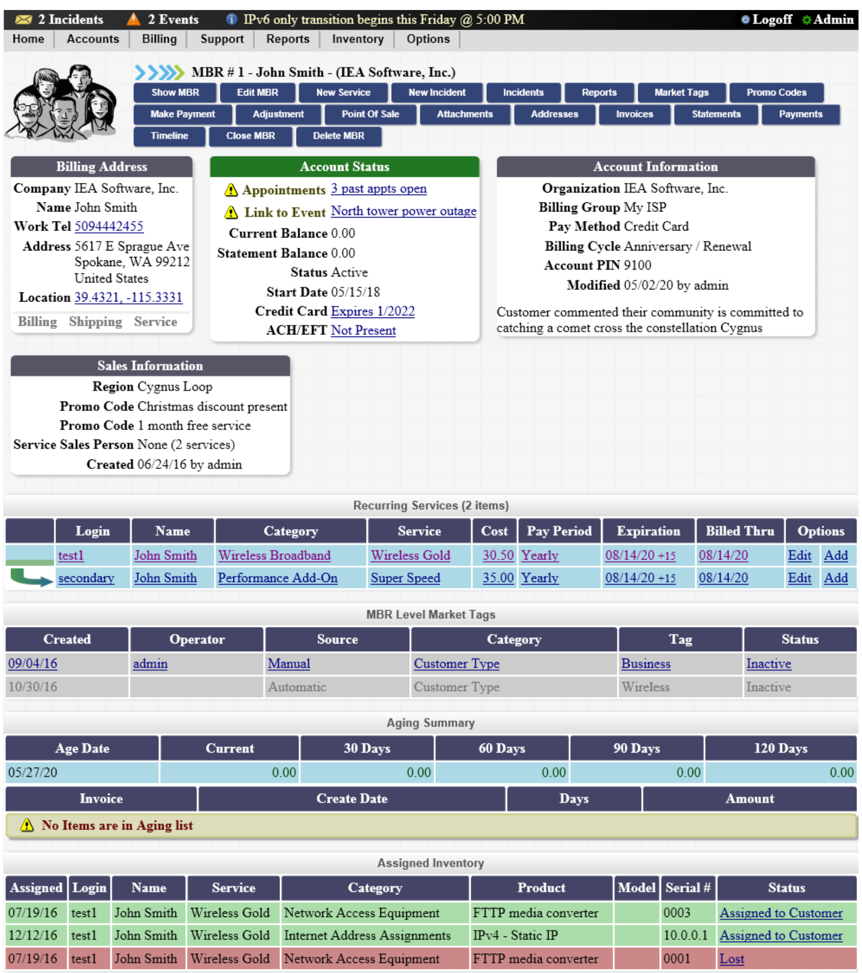

| Field | Description |
|---|---|
| Address Type | Select purpose of initial address created with MBR. Commonly represents primary billing contact of the account. Once MBR is created additional addresses can be assigned at MBR and service level as required. |
| First Name | |
| Last Name | |
| Company | If MBR is a business account company name is entered. For residential customers company is often left empty. |
| Address 1 | Normally a physical address including number, direction and street name. Address 1 may also be a PO BOX if no physical address is available. |
| Address 2 | Additional information such as building, suite or unit number. |
| Country | Availability and ordering of countries can be managed from Countries menu of Geography administrative menu. |
| City | |
| State | State or administrative division. If necessary additional states can be configured within Countries menu of Geography administrative menu. |
| Postal Code | Entering postal code first typically causes appropriate city and state to be automatically filled based on entered postal code. |
| Latitude | Latitude of center of address location in decimal degrees. Latitude can often be obtained automatically where needed by enabling one or more geocoding services. If both latitude and longitude are entered manual configuration takes precedence over automatically determined coordinates from geocoding services. |
| Longitude | Longitude of center of address location in decimal degrees. Longitude can often be obtained automatically where needed by enabling one or more geocoding services. If both latitude and longitude are entered manual configuration takes precedence over automatically determined coordinates from geocoding services. |
| Home Tel | |

| | |
|---|---|
| Work Tel | |
| Fax | |
| Mobile Tel | Used for sending SMS notifications depending on notification options below. |
| Email | Email can be used to send billing and service related notifications depending on notification options below. |
| WWW | Customer website |
| Messaging | Messaging service handles |
| SSN | Government issued unique personal id number |
| Tax ID | Government issued unique id number for tax purposes |
| Drivers Lic # | |
| SMS Hours | Access time representing time of day and day of week SMS notifications are allowed to be transmitted to Mobile Tel. If left blank each notices default contact hours is used. Limit applies to time when SMS messages may be initially queued for delivery rather than actual time of receipt. |
| Email Notification | Classes of Email notifications allowed by be delivered to Email |
| SMS Notification | Classes of SMS notifications allowed to be delivered to Mobile Tel |
| Active | Manages MBR level active status. |
| Billing Group | See account hierarchy |
| Billing Cycle | See billing cycles |
| Region | This field is generally used to define geographical region MBR is associated. Region is sometimes also used to indicate network access point used by customer or tax area for billing purposes. |
| Default Pay Period | Used to define the initial pay period chosen by default when assigning new services to the MBR provided service type's default pay period is configured "MBR Default". Otherwise initial default pay period is ignored and service type default is used.<br><br>Pay Period is used only as a default setting at the MBR level. |
| Pay Method | See pay methods |
| Send Method | See send methods |
| Default Sales Person | Used to indicate sales person associated with MBR creation. The same or different sales persons may be assigned to individual services within the MBR. This field is used strictly for tracking and reporting. |
| Referral | Used to indicate generally how customer was referred to your company. This field is used for tracking and reporting. Referral is not used for any billing related function. |
| Start Date | Initial default starting date of service created within MBR. This field can only be set when initially adding MBR. Start Date is otherwise managed by the account timeline. |
| Temp Extend | Number of days past service expiration plus service grace period to enable service to continue uninterrupted allowing additional time for payment. Temporary extension is automatically reset the next time any payment is applied to the MBR. |
| Credit Limit | Used primarily in conjunction with RADIUS balance based rating rules in order to limit liability for postpaid usage. |
| Bill Day | Unavailable during initial MBR creation. See date fields |
| Bill Month | Available only for calendar billing cycles to override starting month of the billing cycles calendar year.<br><br>For example if an MBR is billed yearly for service and the customer wishes to be invoiced normally each year starting on a particular month this field is selected to configure desired month. |
| CC/EFT Hold Until | For MBRs on CC/EFT automatic payment this setting prevents the system from creating any automatic transactions until the date has passed. This is commonly used when customer is not expected to have funds available until the specified date. This setting does not prevent creation of manual CC/EFT payment transactions from the payments menu of the MBR. |

| | |
|---|---|
| Language | Determines language preference for invoice and statement presentment. |
| Account PIN | Access PIN normally used as a challenge by operators to help verify identity of account holder. Clicking on empty account pin field sets a 4-digit random value.<br><br>If Account PIN is set any operators who are members of an operator group having the group right "Require PIN for MBR Access" enabled will first be required to enter PIN into Emerald in order to gain access to the MBR to view account details or make any changes. When enabled authorization lasts for the configured time period starting from when PIN code is entered. Once authorization expires the PIN will have to be re-entered to maintain MBR access. |
| Comments | Miscellaneous information commonly used to alert other operators of special circumstances related to customer or MBR. Entered comments also appear in account information area of "Show MBR" display. |

## MASTER BILLING RECORD (MBR)

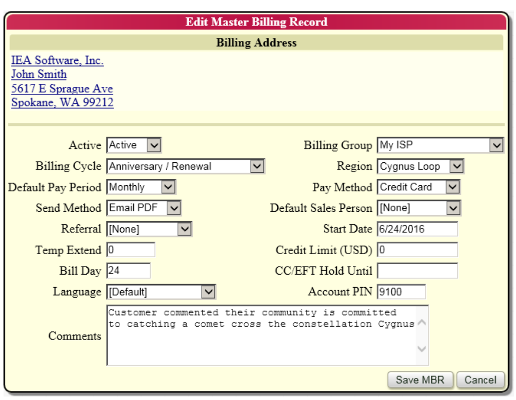
Show MBR menu offers an overview of the customer's account configuration, status and history. Appearance of items in this display depends on account configuration and field visibility options.



| Display | Description |
| --- | --- |
| Address | MBR address information representing billing, shipping and default service address. Often a single address is used for all roles however multiple addresses may be displayed when splitting billing, shipping or default service roles.<br><br>An address may be changed by clicking the address header. Additional MBR level addresses not currently assigned to billing, shipping or default service rules are viewable and managed from Addresses menu. |
| Account Status | MBR level status summary and applicable alerts. Additional status information may be available in account status area of individual services. |
| Account Information | Clicking account information header opens edit MBR form |
| Sales Information | Summary of sales person and MBR market tag assignments and promotional codes. |
| Recurring Services | Displays hierarchy of one time and recurring services assigned to this MBR. The 'Add' option is used to add a child service under an existing service. |
| MBR Level Market Tags | Following tags with hyperlinks enables custom time conditions to be applied to manually activated tags. To disable a tag use the Market Tags menu of the MBR.<br><br>Automatic tags are assigned automatically based on policy and cannot be directly enabled or disabled from the Emerald client.<br><br>Additional MBR level tags may be applicable to MBR yet hidden from view when a tag configured as a hidden tag. |
| Aging Summary | Displays account aging summary as it was at time of last statement. Aged status of currently unpaid invoices as they currently are is also shown separately. |
| Assigned Inventory | Summary of all inventory currently assigned to any service within this MBR. |
| File Attachments | Provides summary of file attachments throughout MBR. Attachments are not displayed by default. To make visible enable "MBR detail" / "Files" via field visibility. |
| Account History | History offers billing and incident summary. The same information is available by clicking History from MBR level reports menu. Account history is not displayed by default. To make visible enable "MBR detail" / "History" via field visibility. |

## Edit MBR

Edit MBR provides for configuration changes to an existing MBR such as billing address, billing group and CC/EFT auto pay. See New MBR above for details of available fields when making changes to an existing MBR.

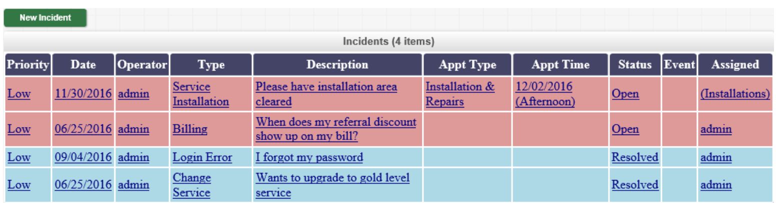


## New Service

This menu option adds primary (root) services to the MBR. To add a child service under an existing service click 'Add' within options column of recurring service display of "Show MBR" menu. See Services / New Service below for details creating a new service.

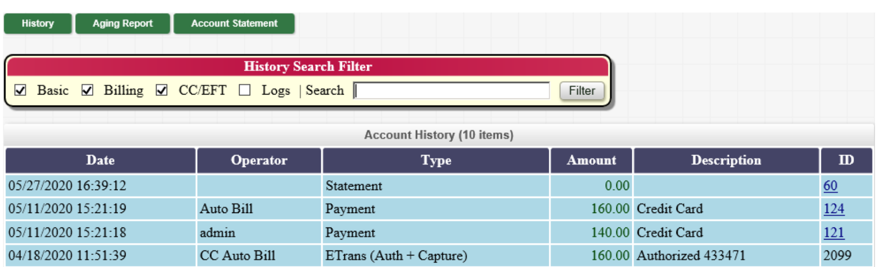
## Incidents

Lists all incidents assigned to MBR and any services. Incidents are displayed with open incidents listed first followed by highest priority and creation date. For more information about incidents see incidents under concepts & definitions.




## Reports

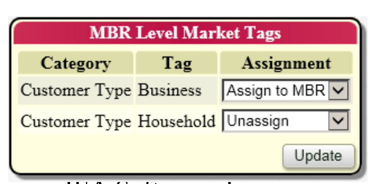
Reports menu offers both standard and custom reporting of MBR specific data.




| Report | Description |
|---|---|
| History | Account history includes data related to all MBR transactions including invoices, statements, payments, CC/EFT transactions, adjustments, incidents, email and audit logs. |
| Aging Report | Displays account aging summary as it was at time of last statement. Aged status of currently unpaid invoices as they currently are is also shown separately. |
| Account Statement | Statement of account reflecting all invoice and payment activity within chosen date range as well as summary of any currently unpaid invoices. |

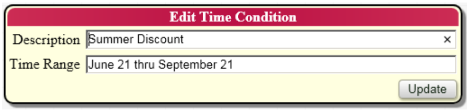
## Market Tags

MBR level manually assigned market tags are enabled or disabled from this menu. Once a market tag has been activated time period over which the tag



remains active can be customized by clicking the activated tag from market tag listing within Show MBR display.

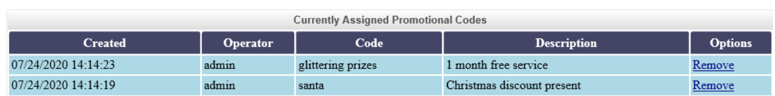
By default when no time conditions are configured a manually activated tag remains active at all times. To restrict availability add a new time condition by following link from market tag listing within show MBR display.



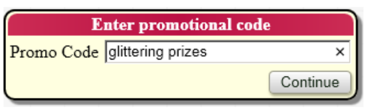

| Field | Description |
|---|---|
| Description | Unique label describing purpose and period of time condition. |
| Time Range | Represents an access time over which this tag shall be active. Either time range or start / end date can be specified. |
| Start/End Date | Represents a starting and ending date over which the tag shall be active. |

## Promo Codes

Promotional codes menu is not displayed by default. Field visibility setting to manage availability is location "MBR" / "Menu Items" / "Promo Codes". All promotional codes currently assigned to MBR are displayed including any codes that have been spent or otherwise not currently contributing service discounts or other benefits.


Currently Assigned Promotional Codes

| Created | Operator | Code | Description | Options |
|---|---|---|---|---|
| 07/24/2020 14:14:23 | admin | glittering prizes | 1 month free service | Remove |
| 07/24/2020 14:14:19 | admin | santa | Christmas discount present | Remove |

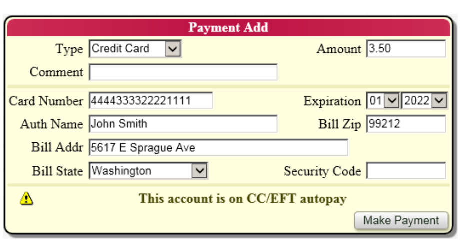



Administratively configured restrictions on applicability of promo codes apply to operators regardless of operator access rights. Some promo codes may not be available to be applied by all operators. Removing promotional codes does not normally have retroactive effects on existing invoicing yet may affect subsequent invoicing activity. Removing and re-applying a promotional code does not serve to "reset" applicability of a promo code for example granting an additional month of discounted service. Such changes would be managed via service level market tags.

For technical information on configuration and implementation of promo codes see Sales & Marketing / Promo Codes section of Emerald Administrators guide.

## Make Payment

Payments made from make payments menu are automatically applied against outstanding invoice line items chronologically from oldest unpaid to newest. If you prefer to pay a specific invoice first click on the desired invoice from Invoices menu and click Payment.



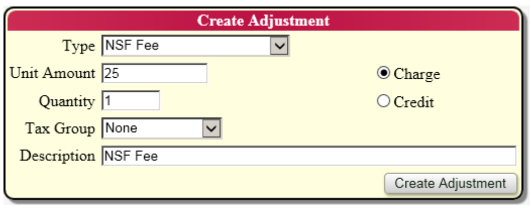

Availability of payment options depends on operator rights, configured batch processors and enabled payment types. Cash, check, and prepaid payments are applied right away. CC and EFT transactions are queued for processing and may take a period of time before associated payment is applied to MBR. Status of queued transactions can be viewed from

Payments menu of MBR. For important details related to each available payment option see Concepts / Payment Types.

Prior to making payments please note any warnings displayed in the payment dialogue. Warnings generally alert operators to conditions such as pending CC/EF transactions that if ignored could lead to accidental overcharging of customers CC or bank account.

It is recommended operators avoid making CC or EFT payments manually for customers on CC/EFT autopay to avoid possibility of mistakes applying payment. Instead to resolve an outstanding balance right away use "Process Transactions" menu option in the Payments menu of MBR. The exception to this is amounts contributed by POS invoices are not included in autopay transactions requiring manual payment to settle.

## Adjustment




Adjustments are one time charges or credits such as service setup or consulting fees. Once an adjustment has been created it's automatically rolled into the next recurring invoice. If a new invoice is not scheduled to be created within the next month (Emerald Admin / Accounting / Settings / Interim Look-Ahead) then the adjustment is rolled into an interim invoice. Once an adjustment is created it may be modified or deleted so long as it has not yet been rolled into an invoice from Invoices menu of MBR.

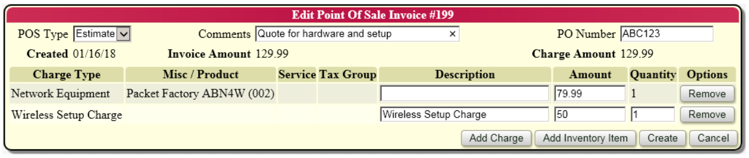
| Field | Description |
|---|---|
| Type | Listing of charge types as configured from Emerald Admin / Accounting / Charge Types best matching reason for charge or credit. Selecting a type automatically defaults unit amount, tax group and description fields. |
| Unit Amount | Unit amount default value is applied automatically whenever type is changed. Unit amount may have precision of up to four decimal places. |
| Quantity | Quantity multiplier. Typically 1. Total line item cost is unit amount * quantity rounded to two decimal places. |
| Charge / Credit | Selects whether adjustment is to be a charge or credit. When changed the unit amount is automatically changed to a positive value to reflect charge or negative value to reflect credit. |
| Tax Group | Tax Group to be used for assessing any taxes applicable to this charge adjustment. Tax group default value is applied automatically whenever type is changed. |
| Description | Line item description of charge or credit adjustment appearing on the invoice. Default value is applied automatically whenever type is changed. |

## Point of Sale

Point of Sale (POS) invoices are used to create a one off sales invoice for purchase of services and physical goods. POS invoices differ from adjustments in the following ways:

- POS invoices are generated immediately. Adjustments are rolled into future recurring service invoice.
- POS invoices contain only charges. Adjustments may include charges and credits.
- POS invoices are not paid automatically when MBR configured for CC/EFT autopay and must be paid manually. Adjustments rolled into invoices are eligible for CC/EFT autopay.

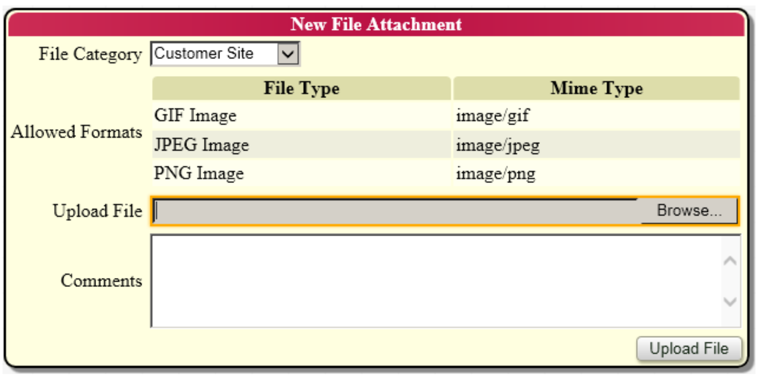
- POS invoices include an estimates feature for offering quotations.
- POS invoices may include sale of physical items from inventory.
- POS invoices offer confirmation of matching of time and data charges with compatible services when purchasing additional blocks of time/data/expiry.




<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>POS Type</td><td>Determines what happens when POS invoice is created.<br><br>
<table>
<tr><th>POS Type</th><th>Description</th></tr>
<tr><td>Invoice</td><td>When POS invoice is created the invoice is fully processed including assessment of applicable taxes, market based discounting and cost adjustments. MBR balance is increased to reflect POS invoice cost.<br><br>Once invoice is created it cannot be modified in the future should changes become necessary. It may only be voided and re-issued.</td></tr>
<tr><td>Estimate</td><td>POS invoices created as estimates vary from invoices in the following ways:<ul><li>Estimates do not affect MBR balance</li><li>Estimates can be modified</li><li>Market based discounting and cost adjustments are not applied</li><li>Taxes are not calculated for estimates</li></ul>Preview option for the estimate from MBR invoices menu can be used to preview the effects of tax amounts and market based discounting. Once an estimate is created it may be converted to an invoice at a later date.</td></tr>
</table>
</td></tr>
<tr><td>Comments</td><td>Comments appear in the Emerald client interface as well as comments area within header of invoice sent to customers. Display of comments on customer invoice may be restricted by invoice level field visibility options.</td></tr>
<tr><td>PO Number</td><td>Purchase order number appears within Emerald client interface as well as PO area within header of invoice sent to customers.</td></tr>
<tr><td>Description</td><td>Line item description of the charge to appear on the invoice sent to customer.</td></tr>
<tr><td>Amount</td><td>Base per-unit amount to be charged not including quantity, taxes or market based discounting. Amount may be specified with precision of up to four decimal places.</td></tr>
<tr><td>Quantity</td><td>Quantity multiplier of line item must have a positive integer value. Quantity is not applicable to line items from inventory.</td></tr>
<tr><td>Add Charge</td><td>Adds new charges line item to POS invoice using interface similar to adjustments. Charges are configured from Emerald Admin / Accounting / Charge Types.</td></tr>
<tr><td>Add Inventory Item</td><td>Inventory status is not updated until POS invoice is created</td></tr>
<tr><td>Create</td><td>See POS Type above</td></tr>
<tr><td>Cancel</td><td>Cancel aborts POS invoice creation irreversibly removing current progress of POS invoice with all associated charges and inventory items. If POS invoice has not been created or canceled it appears within MBR invoices menu with a red background. Incomplete POS invoices may be subsequently removed or edited as necessary from MBR invoices menu.</td></tr>
</table>

## Attachments

Documents associated with the MBR including documents currently assigned to individual services, invoices or payments can be downloaded and managed from attachments menu. Attachments are often used for storing service contracts, customer documentation and imagery related to service installation.


| Field | Description |
|---|---|
| File Category | Indicates purpose and role of file attachment to be uploaded. File category selection determines acceptable file types for upload as well as data retention policy. File categories are managed from Emerald Admin / General menu. |
| Upload File | File available locally to browser client for upload to Emerald server. |
| Comments | Optional informational details describing uploaded file. |

## Addresses

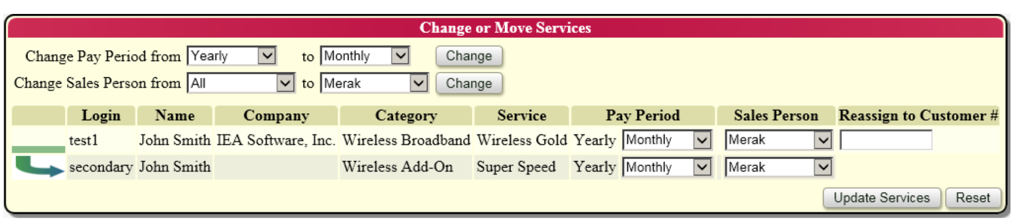
Addresses throughout MBR and services are managed from addresses menu including addresses not currently assigned to any MBR or service roles. When adding new addresses to MBR or service it will automatically be considered for assuming Billing, Shipping and Service roles based on address type.


| Field | Description |
|---|---|
| Address Type | Select purpose of initial address created with MBR. Commonly represents primary billing contact of the account. Once MBR is created additional addresses can be assigned at MBR and service level as required. |
| First Name | |
| Last Name | |

| | |
|---|---|
| Company | If MBR is a business account company name is entered. For residential customers company is often left empty. |
| Address 1 | Normally a physical address including number, direction and street name. Address 1 may also be a PO BOX if no physical address is available. |
| Address 2 | Additional information such as building, suite or unit number. |
| Country | Availability and ordering of countries can be managed from Countries menu of Geography administrative menu. |
| City | |
| State | State or administrative division. If necessary additional states can be configured within Countries menu of Geography administrative menu. |
| Postal Code | Entering postal code first typically causes appropriate city and state to be automatically filled based on entered postal code. |
| Latitude | Latitude of center of address location in decimal degrees. Latitude can often be obtained automatically where needed by enabling one or more geocoding services. If both latitude and longitude are entered manual configuration takes precedence over automatically determined coordinates from geocoding services. |
| Longitude | Longitude of center of address location in decimal degrees. Longitude can often be obtained automatically where needed by enabling one or more geocoding services. If both latitude and longitude are entered manual configuration takes precedence over automatically determined coordinates from geocoding services. |
| Home Tel | |
| Work Tel | |
| Fax | |
| Mobile Tel | Used for sending SMS notifications depending on notification options below. |
| Email | Email can be used to send billing and service related notifications depending on notification options below. |
| WWW | Customer website |
| Messaging | Messaging service handles |
| SSN | Government issued unique personal id number |
| Tax ID | Government issued unique id number for tax purposes |
| Drivers Lic # | |
| SMS Hours | Access time representing time of day and day of week SMS notifications are allowed to be transmitted to Mobile Tel. If left blank each notices default contact hours is used. Limit applies to time when SMS messages may be initially queued for delivery rather than actual time of receipt. |
| Email Notification | Classes of Email notifications allowed by be delivered to Email |
| SMS Notification | Classes of SMS notifications allowed to be delivered to Mobile Tel |

## Move Services

Move Services is not displayed by default. Field visibility setting to manage availability is location "MBR" / "Menu Items" / "Move Services".



Using this menu existing root services within an MBR can be moved to other MBRs.  When a service is moved the service itself and service specific data including assigned child services, address, timelines, monitoring data, aliases, external system data, RADIUS, market tags, alerts, file attachments, incidents and inventory assignments are moved as well.  Invoicing history affecting moved services prior to move is retained within the original MBR.

In addition to moving services operators can quickly individually and bulk change pay period and sales persons for any number of services assigned to an MBR in a single action.

# Invoices

Invoices menu offers ability to view and generate invoices for recurring service.  Unapplied adjustments are also modified or removed from this menu.

Show Invoices | Invoice Current | Preview Next | Invoice Next | Reinvoice | Verify Invoices

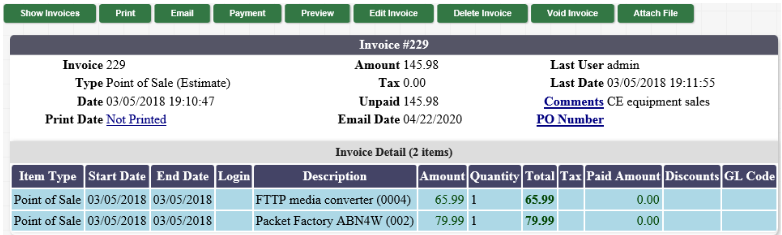
Invoices (13 items)

| Invoice # | Create Date | Invoice Type | Amount | Paid Amount | Print Date | Email Date | PO Number | Comments |
|---|---|---|---|---|---|---|---|---|
| 411 - PAID | 09/01/2019 | Credit Card | 462.00 | 462.00 | Not Printed | 04/22/2020 | | |
| 410 - PAID | 09/01/2019 | Credit Card | 828.00 | 828.00 | Not Printed | 04/22/2020 | | |
| 409 - PAID | 09/01/2019 | Credit Card | 404.50 | 404.50 | Not Printed | 04/22/2020 | | |
| 262 - PAID | 04/30/2018 | Credit Card | 710.70 | 710.70 | Not Printed | 04/22/2020 | | |
| 254 - PAID | 04/16/2018 | Credit Card | 792.01 | 792.01 | Not Printed | 04/22/2020 | | |
| 230 - PAID | 03/08/2018 | Credit Card | 105.00 | 105.00 | Not Printed | 04/22/2020 | | |
| 229 - ESTIMATE | 03/05/2018 | Point of Sale | 145.98 | 0.00 | Not Printed | 04/22/2020 | | CE equipment sales |
| 219 - PAID | 02/25/2018 | Point of Sale | 100.00 | 100.00 | Not Printed | 04/22/2020 | | |
| 8 - PAID | 08/03/2016 | Point of Sale | 65.99 | 65.99 | Not Printed | 04/22/2020 | | |
| 7 - PAID | 07/19/2016 | Renewal | 53.00 | 53.00 | Not Printed | 04/22/2020 | | |
| 6 - PAID | 07/19/2016 | Renewal | 39.95 | 39.95 | Not Printed | 04/22/2020 | | |
| 5 - PAID | 07/19/2016 | Renewal | 46.61 | 46.61 | Not Printed | 04/22/2020 | | |
| 4 - PAID | 07/19/2016 | Point of Sale | 3.50 | 3.50 | Not Printed | 04/22/2020 | | Product Sales |

| Option | Description |
|---|---|
| Show Invoices | Displays current list of invoices in reverse order of creation |
| Invoice Current | Runs recurring invoicing for a single billing period for any services needing to be invoiced based on service billed thru and MBR billing cycle configuration.  If no services require invoicing then invoice current does nothing.  If a service is many billing periods behind it can be caught up by running invoice current until no further invoices are created. |
| Preview Next | Preview outcome of "invoice next" without creating next invoice.  Preview next is not a preview of "invoice current".  See "invoice next: below for more details. |
| Invoice Next | Invoices all recurring services of MBR for their next billing period regardless of whether it is time for customer to be invoiced for next term.  Invoice next is normally only used when the customer wishes to be invoiced far in advance for service.  Each time invoice next is pressed a new invoice is generated for next billing period of service up to the "Invoice Next Term Max Days" limit configured within Emerald Admin / Accounting / Settings. |
| Reinvoice | Reinvoice checks to see whether MBR and service timelines are consistent with current invoices in light of any subsequent possibly retroactive changes such as opening, closing, upgrading or downgrading service post invoice creation.  If system detects one or more invoices need to be reissued in order to become consistent with timeline more information about necessary changes as well as button to execute the change is provided.<br><br>See account timeline for more information managing MBR and service timelines. |
| Verify Invoices | Performs comprehensive crosscheck of all invoicing, line item, balance and payment distribution data within the MBR.  Verify invoices automatically corrects certain discrepancies while other problems may lead to error messages requiring operator intervention to resolve.<br><br>Generally verify invoices is used only in rare instances such as after external changes to invoice and payment data from outside of Emerald or after database conversion from third party solutions to Emerald. |

## Invoice

Following options are available when selecting an invoice or estimate from invoice list.




| Option | Description |
|---|---|
| Show Invoices | Return to invoice listing |
| Print | Opens invoice report for printing. Print format depends on installed reporting technology and default print format in Emerald Client / Options / Localization & UI. |
| Email | When emailing invoice manually email date of the invoice is not changed. Email date is updated when invoice is transmitted via batch email processing. |
| Payment | Opens make payment menu. Payments are first applied to the invoice. Any remaining balance is then distributed in chronological order to the oldest unpaid invoices. |
| Preview | Preview shows what would happen if the POS estimate were converted to an invoice including displaying any applicable taxes and market based cost adjustments. Preview is only available for POS invoices created as estimates. |
| Edit Invoice | Edit allows modification of line items associated with POS estimates and invoices having not yet been created. Edit is not available once a POS invoice has been created. Any modifications post-creation require the invoice to be voided and a replacement issued. |
| Delete Invoice | Delete irreversibly removes POS estimates and POS invoices having not yet been created. Delete cannot be used to remove POS invoices having already been created. Once POS invoice has been created it may only be voided. |
| Void Invoice | When voiding an invoice following steps occur automatically.<br><br>• Billed thru and expiry dates of services associated with recurring line items are reset.<br>• Applicable service level market tag and service invoice counters are reset.<br>• One-time time and data usage allocations are removed when detailed time and data tracking is enabled. No automatic compensation occurs when time and data left tracking is set to simple.<br>• Charge and Credit adjustments are unassigned from voided invoice and converted back to unapplied adjustments ready to be rolled into the next invoice. These adjustments may be modified or removed as necessary from the MBR Invoices menu. This does not apply to POS invoices.<br><br>Normally Emerald enforces chronological ordering of voidable invoices when enabled from Emerald Admin / Accounting / Settings / Enforce Chronological Invoice Void. This prevents operators from voiding older invoices before newer invoices having related line items to void. This constraint is important for recurring accounts to prevent possibility of coverage gaps when resetting service billed thru date and should normally remain enabled to ensure consistency.<br><br>In rare situations where there has been manual misconfiguration of billed thru dates it may become possible for invoices to become interdependent on each other in a way that precludes one from being removed prior to the other. In this case enforcement of chronological void may be temporarily disabled to allow voiding to be completed. It is recommended service billed thru dates in this case be checked to make sure they have been reset to the proper date prior to invoicing. |
| Attach File | Uploads invoice related documents to be stored with this invoice. For more information see attachments. |

## Statements

Display existing statements or preview next statement.


Show Statements | Preview Statement | New Statement

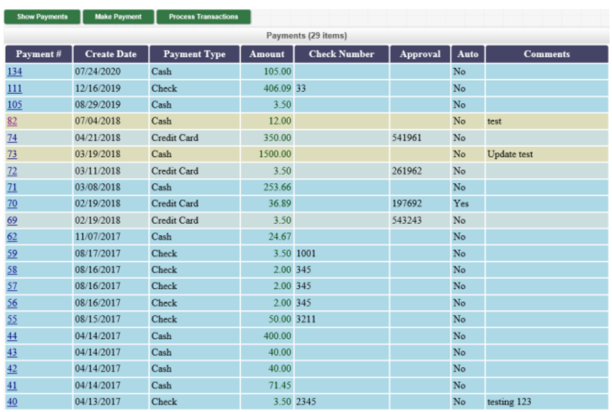
Statements (10 items)

| Statement # | Date | Due | New Charges | New Credits | Prev Balance | End Balance | Print Date | Email Date |
|---|---|---|---|---|---|---|---|---|
| 33 | 03/08/2018 | | 105.00 | 253.66 | 148.66 | 0.00 | Not Printed | Not Sent |
| 32 | 03/08/2018 | 03/31/2018 | 255.82 | 53.56 | -53.60 | 148.66 | Not Printed | Not Sent |
| 31 | 01/10/2018 | | 585.52 | 869.11 | 229.99 | -53.60 | Not Printed | Not Sent |
| 13 | 03/03/2017 | 07/24/2016 | 0.00 | 0.00 | 229.99 | 229.99 | Not Printed | Not Sent |
| 12 | 03/03/2017 | 07/24/2016 | 0.00 | 0.00 | 229.99 | 229.99 | Not Printed | 03/03/2017 |
| 11 | 03/03/2017 | 07/24/2016 | 0.00 | 0.00 | 229.99 | 229.99 | Not Printed | 03/03/2017 |
| 10 | 03/03/2017 | 07/24/2016 | 0.00 | 0.00 | 229.99 | 229.99 | Not Printed | 03/03/2017 |
| 9 | 03/03/2017 | 07/24/2016 | 0.00 | 7.00 | 236.99 | 229.99 | Not Printed | 03/03/2017 |
| 5 | 10/28/2016 | 07/19/2016 | 154.94 | 0.00 | 82.05 | 236.99 | Not Printed | 03/03/2017 |
| 1 | 07/19/2016 | 07/19/2016 | 143.06 | 61.01 | 0.00 | 82.05 | Not Printed | Not Sent |

It's normally recommended operators avoid manually creating statements using "New Statement" menu option.  Manually created statements may lead to future delay in statement creation in response to new invoicing activity depending on configuration of Emerald Admin / Accounting / Settings / "Minimum new statement interval (Days)".

## Payments

In addition to past payments currently pending CC or EFT transactions are shown and managed within this menu.


Show Payments | Make Payment | Process Transactions

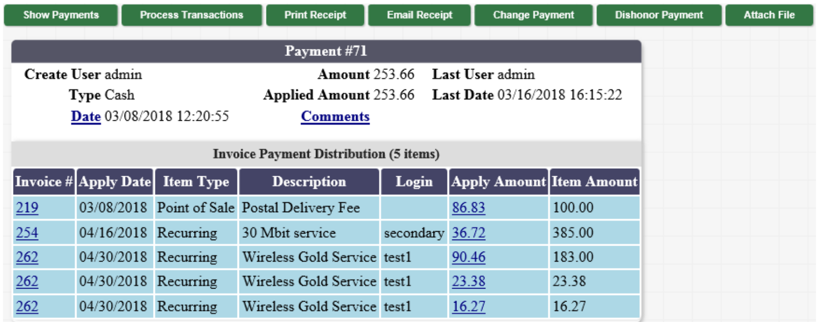
Payments (29 items)

| Payment # | Create Date | Payment Type | Amount | Check Number | Approval | Auto | Comments |
|---|---|---|---|---|---|---|---|
| 134 | 07/24/2020 | Cash | 105.00 | | | No | |
| 111 | 12/16/2019 | Check | 406.09 | 33 | | No | |
| 105 | 08/29/2019 | Cash | 3.50 | | | No | |
| 82 | 07/04/2018 | Cash | 12.00 | | | No | test |
| 74 | 04/21/2018 | Credit Card | 350.00 | | 541961 | No | |
| 73 | 03/19/2018 | Cash | 1500.00 | | | No | Update test |
| 72 | 03/11/2018 | Credit Card | 3.50 | | 261962 | No | |
| 71 | 03/08/2018 | Cash | 253.66 | | | No | |
| 70 | 02/19/2018 | Credit Card | 36.89 | | 197692 | Yes | |
| 69 | 02/19/2018 | Credit Card | 3.50 | | 543243 | No | |
| 62 | 11/07/2017 | Cash | 24.67 | | | No | |
| 59 | 08/17/2017 | Check | 3.50 | 1001 | | No | |
| 58 | 08/16/2017 | Check | 2.00 | 345 | | No | |
| 57 | 08/16/2017 | Check | 2.00 | 345 | | No | |
| 56 | 08/16/2017 | Check | 2.00 | 345 | | No | |
| 55 | 08/15/2017 | Check | 50.00 | 3211 | | No | |
| 44 | 04/14/2017 | Cash | 400.00 | | | No | |
| 43 | 04/14/2017 | Cash | 40.00 | | | No | |
| 42 | 04/14/2017 | Cash | 40.00 | | | No | |
| 41 | 04/14/2017 | Cash | 71.45 | | | No | |
| 40 | 04/13/2017 | Check | 3.50 | 2345 | | No | testing 123 |

| Option | Description |
|---|---|
| Make Payment | See Make Payment |
| Process Transactions | When MBR is configured with CC or EFT autopay process transactions automatically attempts to charge outstanding balance to customer CC or EFT account.  Point of Sale invoices are excluded.<br><br>It is recommended this option be used to process charges rather than manually creating payments for CC/EFT autopay customers in order to minimize opportunity for error. |

### Payment

CC/EFT transaction history if applicable and current distribution of this payment to one or more invoice line items is displayed with each payment.  Effective date of the payment can be changed by clicking date field hyperlink.  Effective date is used for reporting and if possible assessment of late payment fees.  To record comments for a payment click the comments hyperlink.  To redistribute an existing payment to a different invoice follow amount hyperlink within 'Apply Amount' column of the payments invoice distribution list.




| Option | Description |
|---|---|
| Process Transactions | When MBR is configured with CC or EFT autopay process transactions automatically attempts to charge outstanding balance to customer CC or EFT account. Point of Sale invoices are excluded.<br><br>It is recommended this option be used to process charges rather than manually creating payments for CC/EFT autopay customers in order to minimize opportunity for error. |
| Print Receipt | Opens payment receipt in report window for printing |
| Email Receipt | Send copy of payment receipt to specified email address |
| Void Payment | Void payment allows a new CC transaction having not yet settled to be voided. Once a payment has been settled it may no longer be voided. The configuration Emerald Admin / Accounting / Settings / "Allow CC/EFT New Payment Void (Hours)" determines elapsed time from point of creation the void option is to continue to be displayed.<br><br>Emerald is not signaled by transaction gateways upon successful batch settlement. In some cases there may be a period of time where Void option is displayed within Emerald yet the transaction has already settled in the transaction gateway. Similarly it may be possible for Void not to appear when a transaction has yet to settle. In some cases it will be necessary to wait until "Allow CC/EFT New Payment Void" period has passed to use refund payment option in order to credit back a payment made in error. |
| Refund Payment | Refund payment is available for settled CC/EFT transactions to issue a full or partial refund to the customer's bank account with corresponding adjustments to MBR account balance. Only one refund may be issued against any single payment.<br><br>If the reason for refund is an error such as an incorrect charge it is recommended the underlying problem first get resolved prior to issuing any refunds. This is especially important for CC/EFT autopay customers where simply issuing a refund while failing to address underlying problem is likely to cause the customers bank account to again be debited for the same errant charges. |
| Change Payment | Change payment is applicable only to cash, check and custom payment types. This is generally used to correct data entry errors when entering cash or check amounts. Once a payment has been changed once it's no longer possible to make subsequent changes. |
| Dishonor Payment | Dishonor payment is often used in conjunction with check and EFT transactions upon receipt of an NSF notice from bank. When payment is dishonored the amount of payment is reduced to 0 and MBR balance is adjusted accordingly to reflect that the payment is no longer valid.<br><br>It is important to note dishonor payment affects only Emerald. This feature does not update the disposition of payments within transaction gateway. Should dishonor payment be used on a successful EFT payment the result is a loss of synchronization between Emerald's view of transaction and the gateway/bank.<br><br>Dishonor payment should never be used for the purpose of issuing credits or refunds. |

| | |
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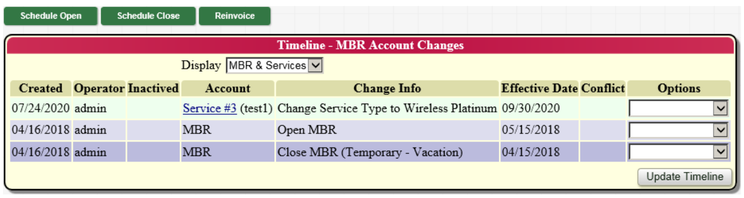
| | When dishonoring payments operator has option of applying an NSF fee to the MBR. Charge type / fee amount is managed via Emerald Admin / Accounting / Settings "NSF Charge Type". |
| Attach File | Uploads payment related documents to be stored with this payment. For more information see attachments. |

## Timeline

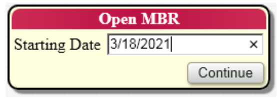
Manages account timelines from MBR perspective. Scheduling MBR open or close from this menu affects all services within MBR per account status hierarchy. To manage changes on per service basis use timeline menu option within service menu of the service.




<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Display</td><td>Filter display of changes to timeline.<br><table><tr><th>Option</th><th>Description</th></tr><tr><td>MBR</td><td>Only changes to the timeline at the MBR level are displayed</td></tr><tr><td>MBR & Services</td><td>Displays changes to both MBR level timeline as well as any service level changes across all active services within MBR</td></tr></table></td></tr>
<tr><td>Created</td><td>Date when operator added change to timeline</td></tr>
<tr><td>Operator</td><td>Operator responsible for adding change to timeline</td></tr>
<tr><td>Inactivated</td><td>If the change is removed from timeline this field reflects date and time of removal. Normally removed items are hidden from display. In circumstances where removal of an item from timeline creates a conflict then the inactivated conflicting items are displayed.</td></tr>
<tr><td>Account</td><td>Displays 'MBR' to indicate change is MBR wide affecting all services or a specific service including service AccountID and login name.</td></tr>
<tr><td>Change Info</td><td>Description of change to be applied. Possible changes include open or close MBR or service and change service type.</td></tr>
<tr><td>Effective Date</td><td>Beginning of full day change described within 'change info' is to start. Effective date is unrelated to 'Created' field above.</td></tr>
<tr><td>Conflict</td><td>Description of conflict including details of existing invoices that may require reinvoicing.</td></tr>
<tr><td>Options</td><td>Once a change is added to the timeline following operations may be applied.<br><table><tr><th>Option</th><th>Description</th></tr><tr><td>Remove Change</td><td>Removes scheduled change from timeline. When a change is removed a conflict may be created if removal would cause a conflict with preexisting invoice. In this case change is still displayed to signify a conflict exists. If no conflicts exist or existing conflict is resolved once a change is removed then it shall then no longer be visible within timeline.</td></tr><tr><td>Ignore Conflict</td><td>Ignoring a conflict means this change no longer triggers prompting for reinvoice. Ignore can be used in case where operator elects to accept</td></tr></table></td></tr>
</table>

| | | |
|---|---|---|
| | | differences and not to reissue an invoice. Should a conflicting invoice be voided and re-issued selecting ignore conflict does not prevent the change from influencing reissued invoices. This option merely suppresses the indication that reinvoice is necessary. |

## Open MBR

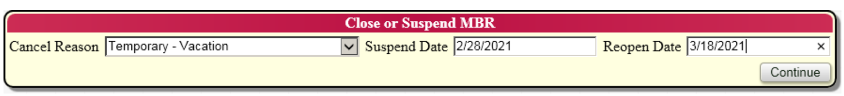



Previously closed MBRs are re-opened using "Open MBR" feature by entering open date reflecting when re-opening of MBR is to become effective. Open MBR is only displayed in the event MBR is currently inactive or closed. Otherwise open can be scheduled regardless of current MBR status from MBR timeline. Process of opening an MBR includes following changes and considerations:

- If MBR was previously inactivated open automatically causes MBR to be immediately activated.
- Any open and active recurring services automatically resume invoicing as of later of MBR open date or service open / billed thru.
- When re-opened invoices are generally created in advance for recurring service per billing cycle invoice bill days configuration.
- If customer has an outstanding balance and is on CC/EFT autopay then autopay transactions may immediately resume when MBR is reopened and activated prior to open date in order to resolve previously outstanding balance.
- Please take note of any warnings displayed while opening MBRs.

## Close MBR

Closing MBR updates account timeline to reflect MBR cancellation. In the event one or more recurring services have already been invoiced ahead of cancellation date MBR is automatically reinvoiced to compensate.




<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Cancel Reason</td><td>When closing MBR select best matching reason for closure.<br><br>Cancel reasons may be temporary or permanent based on "Temporary" field configured within Emerald Admin / Sales & Marketing / Cancel Reasons. See table below for details of important differences between temporary and permanent cancel reasons.<br><br>
<table>
<tr><th>Cancel Type</th><th>Description</th></tr>
<tr><td>Temporary</td><td>Temporary cancel reasons indicate customer is likely to return differing with permanent cancel reasons in the following ways:<br><br>• Operators are provided option of specifying a returning date when the MBR is to be later re-opened while closing MBR for temporary reason.<br>• Temporary rather than permanent service level prorate</td></tr>
</table>
</td></tr>
</table>

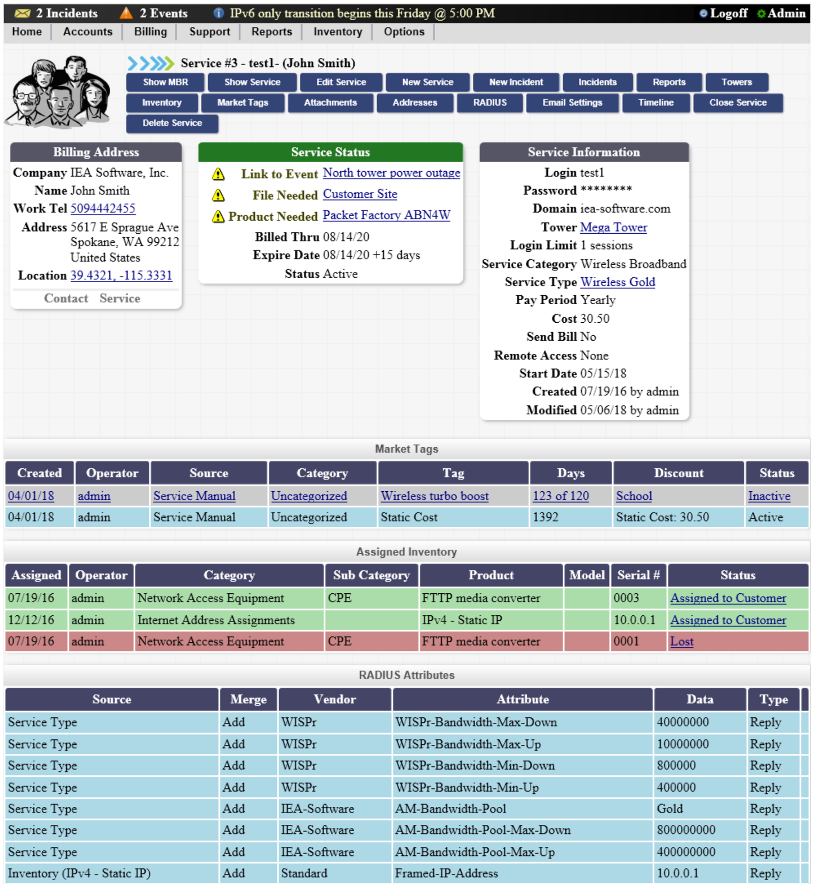
<table>
<tr><td></td><td></td><td>settings apply when closing MBR.<br>• Temporarily canceled MBRs are not eligible to be automatically inactivated.<br>• Market based ETF fees are not assessed when MBR closed with temporary reason.</td></tr>
<tr><td></td><td>Permanent</td><td>Indicates MBR is to be closed with no expectation of being re-opened again in the future. Permanent cancel reasons differ with temporary reasons in the following ways:<br><br>• Operators are not provided with an option of specifying date returning when closing MBR for permanent reason.<br>• Permanent rather than temporary service level prorate settings apply when closing MBR.<br>• Permanently canceled MBRs are eligible to be automatically inactivated once account balance is settled.<br>• Market based ETF fees can only be assessed when MBR closed with permanent cancel reason.</td></tr>
<tr><td>Cancel/Suspend Date</td><td colspan="2">Represents full day after which MBR is considered to be permanently or temporarily closed. MBR and related services continue to be available normally until cancel date has passed.<br><br>In some circumstances service expiration date of one or more services may exceed cancellation date in which case service remains active and accessible until expiration date has passed.<br><br>Most typical cause of discrepancy between cancel date and service expiration is service type level proration configured for either "full month" or "no credit". Since in this case a user may be charged for remaining month or period past configured cancellation account remains accessible for the duration of period paid by customer.</td></tr>
<tr><td>Reopen Date</td><td colspan="2">Optional date MBR services are to resume. Reopen date is only displayed at MBR level when the selected cancel reason is temporary.</td></tr>
</table>

### Delete MBR

Delete MBR option is permanent and cannot be reversed from Emerald. Use of this feature is not recommended as a standard account procedure. We recommend inactivating MBRs rather than deleting them to enable account details to be referenced in the future should it become necessary. When an MBR is deleted associated data is retained for historical reporting purposes.

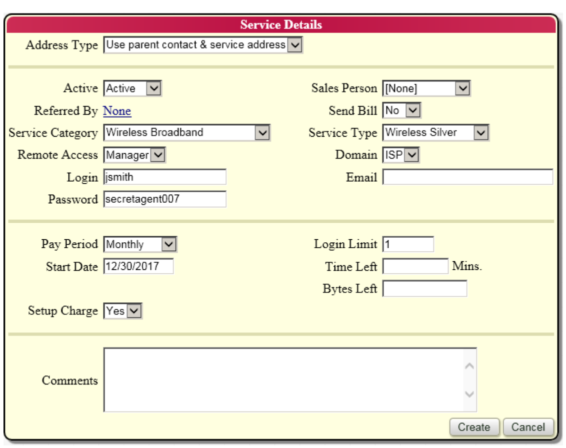
## SERVICES

Show service menu offers an overview of the customer's service within MBR including account configuration and status. Appearance of items in this display depends on service configuration and field visibility options.




## New Service / Edit Service

Create new or edit an existing service within MBR. To add a child service under an existing service click 'Add' within options column of recurring service display within "Show MBR" menu.



<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Address Type</td><td>When creating a new service this field determines initial address and or contact for the service.<br><br>If "Use parent contact & service address" is selected parent service or MBR level address will be automatically linked to this service. If a different address type is selected new service form is updated with address type specific input fields and the new address is created and assigned to the service during creation of service.<br><br>When editing an existing service the address type field is not displayed. Instead the address or contact information for this service is displayed. If hyperlinked the address may be edited directly by clicking on the link from edit service menu. If not hyperlinked this indicates the address belongs to parent service or MBR and the address should be edited at that level.<br><br>Service specific addresses can be added or changed at any time from the Addresses service menu. This can be used if you would like to assign a service specific address where previously a parent linked address was used.</td></tr>
<tr><td>Active</td><td>Determines service level active status. See Account Status.</td></tr>
<tr><td>Sales Person</td><td>Sales person responsible for this service. Used by commission reporting to assign credit</td></tr>
<tr><td>Referred By</td><td>Provides a way of linking referred customer to an existing referring customer by specifying the referring customer here. Clicking hyperlink opens form to manage referral linking.<br><br>Referrals may be used for informational purposes or leveraged by referral manager to automatically assign referral credits to referring and or referred customer. Referral manager is located within the Emerald Admin / Sales & Marketing menu.</td></tr>
<tr><td>Send Bill</td><td>Send bill is a legacy feature when enabled adds service level 'Email' field to MBRs billing email list when transmitting billing related account status messages such as invoices, statements, payment receipts and account expiration warnings. If send bill is enabled and service level Email field is empty then service Login '@' selected domain is assumed as Email contact. Send bill is disabled by default when adding new services. It is recommended email be set with applicable notification options when managing addresses rather than using send bill feature.</td></tr>
<tr><td>Service Category</td><td>See service categories.<br><br>When adding new root service under MBR available service categories are limited to those service categories with "root category" enabled.<br><br>When adding a child service under an existing parent service available service categories are limited to those allowed as a parent service category of the parent service.<br><br>When editing an existing service existing service category can only be changed to another category having a fully compatible configuration. This includes meeting all of the following requirements:<ul><li>Currently configured service type is also assigned to new service category</li><li>New service category is compatible with any child services of the service being edited</li><li>Future scheduled service type changes in the account timeline are also assigned to new service category.</li></ul></td></tr>
<tr><td>Service Type</td><td>See service types. Available service types depend on service category assignment.</td></tr>
<tr><td>Remote Access</td><td>Manages access to Emerald customer center using service login and password fields.<br><br><table><tr><th>Access</th><th>Description</th></tr><tr><td>Manager</td><td>Full MBR level access to the MBR and services including:<ul><li>Viewing billing history</li><li>View RADIUS Acct or CDR usage history</li></ul></td></tr></table></td></tr>
</table>

| | | |
|---|---|---|
| | | • Upgrade and or downgrade service<br>• Provision new service<br>• Cancel or suspend service<br>• Change service password<br>• Change service login<br>• Create support tickets<br>• Recharge service<br>• Modify pay method and billing address<br>• Make one time credit card or prepaid card payment<br><br>Actual rights granted to users with Manager access depend on service category specific customer access settings and Emerald Admin / Web Interface / Customer Settings. |
| | Service | Limits access only to the service customer is logged in as. Access to the MBR and other services within the MBR are restricted. Service access does not include customer account management, one time purchases or billing histories. Depending on administrative configuration service access may include the following:<br><br>• View RADIUS Acct or CDR usage history<br>• Change service password<br>• Change service login<br>• Create support tickets |
| | None | Access to the Emerald customer center using service login and password is disabled. Attempting to login with credentials results in general "Invalid Username or Password" failure. |
| Domain | Listing of available domains assigned globally, by billing group or MBR. Domain selection affects RADIUS authentication and some hosting, messaging related external systems and service level "send bill" field above. | |
| Login | Service login and password field may be used for one or more of following depending on service type:<br><br>• Network access via RADIUS /w either user or MAC auth<br>• Access to customer account center customer self-management portal<br>• External service provisioning of hosted services such as email/groupware system<br><br>When authenticating via RADIUS users may login as either user or user@domain selected in domain field above. | |
| Email | Email is a legacy field typically unused and left empty. It may be used in "send bill" field above and by some messaging external systems. Recommended email address for customer contact / notification purposes are configured by MBR or service level address. | |
| Password | See login. Depending on operator group rights password field may be masked appearing as a series of asterisks ' ********'. | |
| Pay Period | See [pay periods]<br><br>Default pay period when adding new service is derived from service type level default setting. If service type is configured to use "MBR Default" then value of MBR level pay period is used as default setting. | |
| Service Quantity | Acts as a cost multiplier for purpose of recurring service invoicing, discounting and ETF fees. While invoicing the monthly service cost and any static discounts are multiplied by service quantity. If zero or less service quantity is ignored and default value of 1 assumed.<br><br>When service quantity is greater than 1 service quantity is displayed as part of line item | |

| | |
|---|---|
| | description of invoice. This field acts as a cost multiplier and does not affect the following:<br><br>• Invoice line item quantity field<br>• Pricing of any setup charges or adjustments<br>• Usage rating<br>• Time and data allocation<br><br>It's recommended multiple services be added to an MBR rather than using service quantity where practical.<br><br>This field is not visible by default and must be enabled via field visibility location "Service / Edit Forms / Service Quantity = Show". It's recommended this field only be enabled for specific service types requiring it via Emerald Admin / Services / Service Type Fields to minimize operator error. |
| Login Limit | Indicate the number of concurrent RADIUS sessions this service may establish at the same time. To be effective concurrency control must be enforced by at least one of the following methods:<br><br>• During RADIUS authentication prior to start of session via RadiusNT/X administrator '(Auth) Concurrency control' advanced menu option.<br>• Using RADIUS dynamic authorization to disconnect oldest sessions exceeding concurrent access limit on a post-authentication basis via Emerald session manager. See Emerald Administrator's guide for configuration details of session manager.<br><br>Enforcement of concurrency limits depends entirely on prompt reliable reception of RADIUS accounting data across all access servers. It is imperative a robust retransmission policy be configured within each access server to ensure reliable reception of accounting data. Unreliable receipt of accounting data may result in any of following conditions:<br><br>• RADIUS authentication may succeed even though session limit is reached<br>• RADIUS authentication may fail even though session limit is not reached<br>• Session manager may fail to enforce concurrent session limit<br><br>In event of unreliable reception of RADIUS Accounting following may be used to mitigate some adverse effects:<br><br>• CoA session probe feature of Emerald session manager configured per Emerald Admin / RADIUS / Access Servers. See Emerald Administrator's guide for details.<br>• Enabling interim accounting across all access servers and scheduling query {CALL RadClearInterim(3,NULL)} to execute periodically. |
| Start Date | Indicate initial opening date of service. This field may only be set when initially adding a service. Start Date is otherwise managed via the account timeline. |
| Expire Date | See date fields |
| + N Days | Used in conjunction with Expire Date field above to provide a permanent grace period for this account. When non-zero system allows continued access past expire date up to configured number of days.<br><br>The default grace period selected automatically when creating a new service is determined by the following configurations in order of precedence:<br><br>• Permanent grace period of parent service<br>• Service type level default extension days<br>• Billing cycle default extension days<br>• Billing group specific accounting settings default expire grace period<br>• Global accounting settings default expire grace period |

| | |
|---|---|
| | If MBR level temporary extension is configured the value of this field is added to MBR level extension to determine overall extension days.<br><br>This field is not used or displayed with non-recurring services. Extension field is also ignored providing no grace period when MBR and or service is canceled. |
| Billed Thru | See date fields |
| Setup Charge | Used to indicate whether any setup charge(s) assigned to the selected service type should be applied when initially creating service.<br><br>Depending on access rights you may not have option of disabling setup charge. Setup charges are created as charge adjustments during creation of new service and can be modified or removed prior to being rolled into an invoice from the Invoices menu of the MBR.<br><br>In addition to service type configuration availability of setup charge depends on chosen pay period and Emerald Admin / Accounting / Settings / "Allow Setup Charge…" options. |
| Time Left | When not empty overall session duration of RADIUS authenticated users is limited to value of this field in minutes. Time left is automatically reduced rounded up to the next full minute at conclusion of each user session.<br><br>Depending on service recurring status and service type configuration time left may be renewed automatically on a daily or monthly basis.<br><br>If time left is renewed on a monthly basis renewal always occurs on the billing day of the MBR regardless of whether service has been paid/expired. Applying payment to cover recurring service invoice line item does not trigger renewal of time left.<br><br>Time left may also be refilled for recurring and nonrecurring services by purchase of time & data products from customer center as configured via Accounting / Time & Data Charges menu of Emerald Administrator. Once purchased time left is credited to the users service once payment is made in full.<br><br>To be effective time left must be enforced by at least one of the following methods:<br><br>• During RADIUS authentication prior to start of session via RadiusNT/X administrator '(Auth) Time & Data banking' advanced menu option. This option is only accurate while user is unable to consume time from multiple sessions at the same time.<br>• Using RADIUS dynamic authorization to disconnect all active sessions of user once aggregate session time across all of the users session(s) exceed remaining time left via Emerald session manager. Session manager is required to accurately enforce time limits when user is allowed to open multiple concurrently active sessions. See Emerald Administrator's guide for configuration details of session manager. |
| Bytes Left | When not empty overall upload and download data consumption of RADIUS authenticated users is limited to value of this field. Byte left is automatically reduced as a result of receipt of any periodic Interim accounting updates and the conclusion of user session.<br><br>Depending on service recurring status and service type configuration bytes left may be renewed automatically on a daily or monthly basis.<br><br>If bytes left is renewed on a monthly basis renewal always occurs on the billing day of the MBR regardless of whether service has been paid/expired. Applying payment to cover recurring service invoice line item does not trigger renewal of bytes left.<br><br>Bytes left may also be refilled for recurring and nonrecurring services by purchase of time & data |

| | |
|---|---|
| | products from customer center as configured via Accounting / Time & Data Charges menu of Emerald Administrator. Once purchased bytes left is credited to user's service once payment is made in full.<br><br>To be effective bytes left must be enforced by at least one of the following methods:<br><br>• During RADIUS authentication prior to start of session via RadiusNT/X administrator '(Auth) Time & Data banking' and ' (Auth) Limit data left using WISPr-Session VSAs' advanced menu option. The access server is required to support WISPr session limiting VSAs. This option is only accurate while user is unable to consume data across multiple sessions at the same time.<br>• Using RADIUS dynamic authorization to disconnect all active sessions of user once aggregate session bytes remaining across all of the user's session(s) exceed remaining bytes left via Emerald session manager. Session manager is required to accurately enforce byte limits when user is allowed to open multiple concurrently active sessions. See Emerald Administrator's guide for configuration details of session manager. |
| Rating Time Left | Similar to time left field except consumption of rating time left is managed by rating engine enabling advanced policies such as tiered and discounted off-peak time consumption.<br><br>Field is only visible when service type is assigned a rate class. |
| Rating Bytes Left | Similar to bytes left field except consumption of bytes left is managed by rating engine enabling advanced policies such as tiered and discounted off-peak data consumption. If consumption is to vary by time of day or day of week it is recommended access servers be configured to transmit interim accounting data in order to improve the accuracy of bytes left costing.<br><br>Field is only visible when service type is assigned a rate class. |
| *** | Represent custom fields added as a result of service custom data fields assigned to the selected service type or from any external systems assigned to the service type. Available service custom data fields are configured from the "Admin" / "Services" / "Custom Data" field and the "Admin" / "Advanced" / "External System Types" administrative menus. |
| Comments | Used to enter general informational notes relating to the service. Comments appear when editing service as well as "Show service" display. |

## Incidents

Lists all incidents assigned to this service. Incidents are displayed with open incidents listed first followed by highest priority and creation date. For more information about incidents see incidents under concepts & definitions.

New Incident

Incidents (4 items)

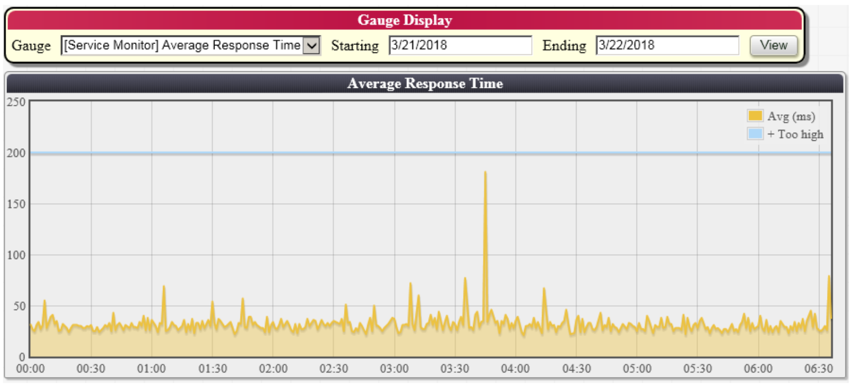
| Priority | Date | Operator | Type | Description | Appt Type | Appt Time | Status | Event | Assigned |
|---|---|---|---|---|---|---|---|---|---|
| Low | 11/30/2016 | admin | Service Installation | Please have installation area cleared | Installation & Repairs | 12/02/2016 (Afternoon) | Open | | (Installations) |
| Low | 06/25/2016 | admin | Billing | When does my referral discount show up on my bill? | | | Open | | admin |
| Low | 09/04/2016 | admin | Login Error | I forgot my password | | | Resolved | | admin |
| Low | 06/25/2016 | admin | Change Service | Wants to upgrade to gold level service | | | Resolved | | admin |

## Reports

Offers service specific reporting including Gauges and Call History as well as any service level custom reports.

## Gauges

All available diagnostic data points collected for a service is viewable from gauges report.  Data is able to be collected from a variety of sources including Emerald service monitor (ICMP and SNMP) and external collection via Emerald API and database interfaces.




| Field | Description |
|---|---|
| Gauge | Gauge represents type of data to be reported such as data rates, response times and signal quality.<br><br>When "All" is selected charts are displayed for all gauges for which data is available at any time between starting and ending periods. |
| Starting / Ending | Beginning and ending points in time over which data is to be charted.  Time of day may optionally be included.  By default starting date is a month ago and ending date is tomorrow.<br><br>If no data is immediately available for a given chart as of starting date then chart display begins with next available data point as described within x-axis time labels.  If no data is available no chart is shown.<br><br>Regardless of starting and ending range or quantity of data available an upper limit of 2000 data points are plotted per chart.  When more than 2000 data points are present some or all data points are averaged with adjacent data prior to display.  This averaging process may conceal values occurring out of normal range unless starting and ending periods are narrowed to view smaller slices of time with more detail. |

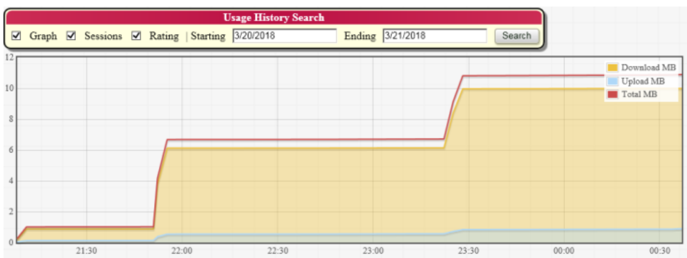
## Call History

User's network session history is viewed from call history report.  Time, duration, data usage, network identifiers and reason for disconnect is displayed for each completed session within history table.  Currently active sessions and interim usage data are not included within session history.  Records within history table having gold background indicate no corresponding start data for that session was previously received.  This is normally an indication of presence of missing accounting data.  Report Emerald Client / Reports / Systems & RADIUS / Access Server Acct Status can be used to gather more information to assist administrators in understanding and correcting any problems.  To ensure reliable delivery it is important all access servers be configured with a robust accounting retry policy.

Usage graph includes interim usage data from completed sessions and currently active sessions where interim accounting is available. When interim data is available usage graph offers a significantly more granular picture of data consumption over time than is provided via figures in session history table alone.

For data limited service user's data left field is debited upon receipt of both interim and stop data. It is recommended usage graph be used as primary means of understanding a user's data consumption especially when handling any customer questions about usage. This is to avoid confusion and doubts due the following considerations:

- Session history table covers only data for completed sessions however data is debited from user based on interim session updates.
- Long-lived sessions beginning outside of the starting and ending date range specified can contribute to actual usage occurring within the reporting period and remain hidden to the operator unless search is expanded.




Session History - Period 3/20/2018 to 3/21/2018

| Call Date | Mins | Download MB | Upload MB | Username | Port Type | Terminate Cause | IP Address | Calling Station | Server |
|---|---|---|---|---|---|---|---|---|---|
| 03/20/18 21:07:17 | 1 | 0.22 | 0.04 | test | Wireless-802.11 | Lost-Carrier | | 9084.0dc3.c745 | tesla |
| 03/20/18 21:08:15 | 43 | 0.67 | 0.09 | test | Wireless-802.11 | Lost-Carrier | | 9084.0dc3.c745 | tesla |
| 03/20/18 21:51:05 | 2 | 2.88 | 0.25 | test | Wireless-802.11 | Lost-Carrier | | 9084.0dc3.c745 | tesla |
| 03/20/18 21:52:19 | 165 | 6.21 | 0.52 | test | Wireless-802.11 | Lost-Carrier | | 9084.0dc3.c745 | tesla |

| Username | Total Sessions | Total Mins | Total Download MB | Total Upload MB |
|---|---|---|---|---|
| test | 4 | 211.00 | 9.99 | 0.91 |

Rating Summary

| Source | Rate | Rule Set | Starting | Ending | Count | Hours | Data (MB) | Cost | Applied |
|---|---|---|---|---|---|---|---|---|---|
| Call records | 10 GB free | 10 GB free .25/GB | 12/25/17 | 01/25/18 | 4 | 0.00 | 4000.00 | 0.00 | No |

.

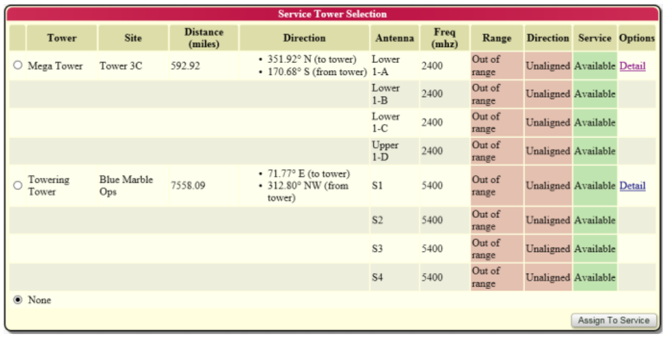
For services billed for data consumption on a post-paid basis rating summary displays current consumption as well as any associated costs. "Applied" column indicates whether or not a charge adjustment has yet to be generated for time or data usage. Normally adjustments are not created until after the billing month has concluded including a small additional delay to account for long-lived sessions.

Depending on rating configuration rating summary display may include contributions from both interim and stop data or stop data exclusively.

## Towers

The tower listing is ranked by proximity of customer's service location to each tower. For each antenna of each tower columns range, direction and service offers an indication of whether service is able to be provided.

Assigning a service to tower enables customers to be managed at the tower level for reporting, bulk messaging and tower specific event management.



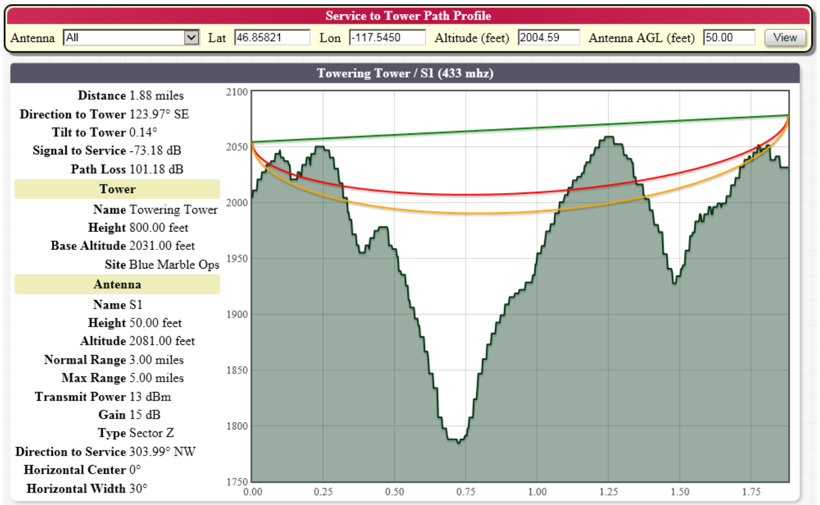
Service Tower Selection

| | Tower | Site | Distance (miles) | Direction | Antenna | Freq (mhz) | Range | Direction | Service | Options |
|---|---|---|---|---|---|---|---|---|---|---|
| ○ | Mega Tower | Tower 3C | 592.92 | • 351.92° N (to tower) • 170.68° S (from tower) | Lower 1-A | 2400 | Out of range | Unaligned | Available | Detail |
| | | | | | Lower 1-B | 2400 | Out of range | Unaligned | Available | |
| | | | | | Lower 1-C | 2400 | Out of range | Unaligned | Available | |
| | | | | | Upper 1-D | 2400 | Out of range | Unaligned | Available | |
| ○ | Towering Tower | Blue Marble Ops | 7558.09 | • 71.77° E (to tower) • 312.80° NW (from tower) | S1 | 5400 | Out of range | Unaligned | Available | Detail |
| | | | | | S2 | 5400 | Out of range | Unaligned | Available | |
| | | | | | S3 | 5400 | Out of range | Unaligned | Available | |
| | | | | | S4 | 5400 | Out of range | Unaligned | Available | |
| ◉ | None | | | | | | | | | |

Assign To Service

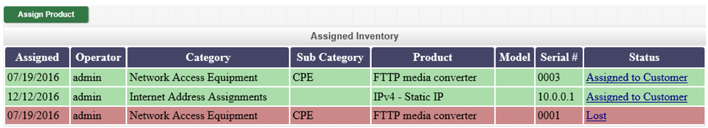
| Column | Description |
|---|---|
| Range | Range is configured at the tower antenna level indicating whether service location is within defined range limit of the tower's antenna. |
| Direction | Indicates whether tower's antenna orientation is compatible with service location. |
| Service | Reflects whether service category of this service is compatible with this tower's antenna. |

When elevations dataset is available (See readme.txt in heightmaps folder where Emerald was installed) the detail link from tower menu displays terrain between service location and tower with 1st and 60% of 1st Fresnel zones. Elevations data is also used for Longley-Rice path loss prediction.




## Inventory

Items assigned to customer necessary to provide service such as network equipment and IP assignments are managed from service inventory menu.



Assign Product

Assigned Inventory

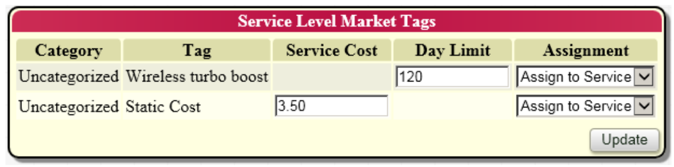
| Assigned | Operator | Category | Sub Category | Product | Model | Serial # | Status |
|---|---|---|---|---|---|---|---|
| 07/19/2016 | admin | Network Access Equipment | CPE | FTTP media converter | | 0003 | Assigned to Customer |
| 12/12/2016 | admin | Internet Address Assignments | | IPv4 - Static IP | | 10.0.0.1 | Assigned to Customer |
| 07/19/2016 | admin | Network Access Equipment | CPE | FTTP media converter | | 0001 | Lost |

To reassign or modify status of an existing item follow hyperlink within status column.

Items can be sold from inventory using Point of Sale menu of the MBR.

## Market Tags

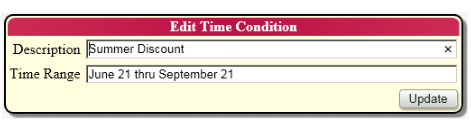
Service level manually assigned market tags are enabled or disabled from this menu. When assigned some service tags offer options to customize monthly service cost and limit maximum duration tag is to remain active.




| Column | Description |
|---|---|
| Service Cost | Custom monthly base recurring cost overriding default service pricing. In the event a service cost is set by multiple active service level market tags cost associated with tag having the highest sort order is used.<br><br>Service cost is only applicable to recurring service having on effect on one-time data/time/expirary purchases. |
| Day Limit | Maximum number of days service is allowed to be invoiced over which the market tag remains active. For example if day limit is 90 then next 3 months of service are invoiced with market tag active. After 3 months the tag is no longer active. If the service has a pay period of a longer term such as semi-annual or yearly and active status of market tag affects service pricing then separate line items are generated covering periods where tag is active and inactive separatly.<br><br>Multiples of 30 days are counted as a full months. |

Once a market tag has been activated time period over which the tag remains active can be customized by clicking the activated tag from market tag listing within Show Service display.

By default when no time conditions are configured a manually activated tag remains active at all times. To restrict availability add a new time condition by following link from market tag listing within show MBR display.




| Field | Description |
|---|---|
| Description | Unique label describing purpose and period of time condition. |
| Time Range | Represents an access time over which this tag shall be active. Either time range or start / end date can be specified. |
| Start/End Date | Represents a starting and ending date over which the tag shall be active. |

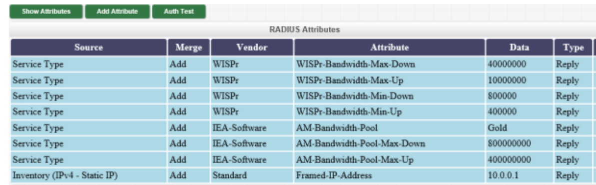
## Attachments

Identical to MBR attachments except only documents assigned specifically to this service are displayed.

## Addresses

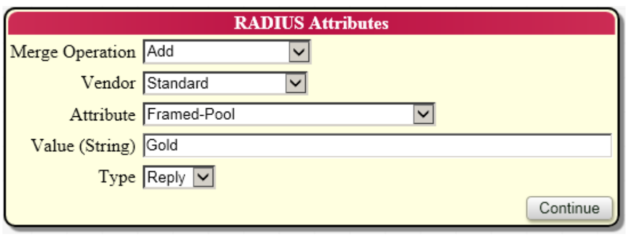
Identical to [MBR addresses] except only addresses assigned specifically to this service are displayed.

## RADIUS




| Source | Merge | Vendor | Attribute | Data | Type |
|---|---|---|---|---|---|
| Service Type | Add | WISPr | WISPr-Bandwidth-Max-Down | 40000000 | Reply |
| Service Type | Add | WISPr | WISPr-Bandwidth-Max-Up | 10000000 | Reply |
| Service Type | Add | WISPr | WISPr-Bandwidth-Min-Down | 800000 | Reply |
| Service Type | Add | WISPr | WISPr-Bandwidth-Min-Up | 400000 | Reply |
| Service Type | Add | IEA-Software | AM-Bandwidth-Pool | Gold | Reply |
| Service Type | Add | IEA-Software | AM-Bandwidth-Pool-Max-Down | 800000000 | Reply |
| Service Type | Add | IEA-Software | AM-Bandwidth-Pool-Max-Up | 400000000 | Reply |
| Inventory (IPv4 - Static IP) | Add | Standard | Framed-IP-Address | 10.0.0.1 | Reply |

RADIUS authorization attributes transmitted in Access-Accept responses can be customized on a per service basis overriding assigned defaults. This is commonly used to customize network filters, bandwidth allocations and pool assignments. Only attributes added from this menu may be modified or removed.




| Field | Description |
|---|---|
| Merge Operation | Merge operation determines how this attribute will interact with existing authorization attributes queued before it. Ordering in which attributes are processed can affect outcome of merge operations and may also affect meaning of attributes transmitted.<br><br>In addition to service type level authorization attributes, additional attributes may be merged from a variety of sources during user authentication. Those sources in the order they are merged are provided in the table below.<br><br>**Order / Source**<br>1st – Service type attributes<br>2nd – Service type attributes added by presence of child services where one or more of the child's service type RADIUS attributes are set "Applies To" = "Parent Service".<br>3rd – Per account service level custom attributes<br>4th – Attributes associated with active market tags<br>5th – Attributes associated with inventory assigned to service<br><br>The "Show Attributes" menu option displays all attributes in order of processing.<br><br>Listing of all supported merge operations is found below. The typical recommended merge operation is "Add" which simply appends an attribute to the set of outgoing authorization attributes.<br><br>**Option / Description**<br>Add – Adds a new RADIUS attribute of type "Attribute Vendor" and "Attribute" containing the value "Attribute Value".<br>Add or replace value – Similar to Replace value except that if no attributes match the attribute containing the new value is added. |

<table>
<tr><td></td><td><table>
<tr><td>Delete</td><td>Delete any attribute matching the "Attribute Vendor" and "Attribute" fields.</td></tr>
<tr><td>Delete matching</td><td>Delete any attribute matching the "Attribute Vendor" and "Attribute" fields also having a matching "Attribute Value"</td></tr>
<tr><td>Replace value</td><td>For every RADIUS attribute matching "Attribute Vendor" and "Attribute" replaces its current value with contents of "Attribute Value".</td></tr>
</table></td></tr>
<tr><td>Vendor</td><td>Select the appropriate attribute vendor from vendor selection list to change attribute space to selected vendor. Once attribute vendor has changed "Attribute" list below is automatically updated to reflect attributes available for the vendor. Available vendors and attributes are managed from the RADIUS vendors menu.</td></tr>
<tr><td>Attribute</td><td>Select the appropriate Attribute from the attribute selection list. Only the attributes for the above selected Vendor will be available in the pick list.</td></tr>
<tr><td>Attribute Value</td><td>Enter desired attribute value corresponding to selected attribute above.</td></tr>
<tr><td>Type</td><td>Whether attribute is to be transmitted with authorization response or checked against authentication request. Typical recommended setting is "Reply".<br><br><table>
<tr><th>Type</th><th>Description</th></tr>
<tr><td>Reply</td><td>Attribute will be transmitted normally as an authorization attribute included with RADIUS Access-Accept response.</td></tr>
<tr><td>Check</td><td>Attribute and value is checked against Access-Request attributes transmitted with RADIUS authentication request. If request attribute of the same type as check attribute is present then its value must match check attributes value or authentication fails. If multiple check attributes are defined of the same "Vendor" and "Attribute" then one of the check attribute values must match authentication request.</td></tr>
</table></td></tr>
<tr><td>Applies To</td><td>Determines which service this attribute is assigned. Typical recommended setting is "Self". This field is only visible when the service is a child of a parent service.<br><br><table>
<tr><th>Type</th><th>Description</th></tr>
<tr><td>Self</td><td>Attribute will be applied directly to the service account</td></tr>
<tr><td>Parent Service</td><td>Attribute will be applied to the services parent service</td></tr>
</table></td></tr>
<tr><td>Sort Order</td><td>Determines order in which attributes assigned from service RADIUS attributes are to be merged and appear in RADIUS authorization Access-Accept response.</td></tr>
</table>

After making changes it is often possible to perform a test using "Auth Test" menu option to view results of merged reply attributes. In some cases test may not be possible or test results may vary from actual response attributes due to following reasons:

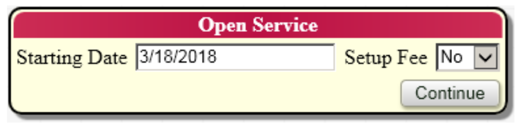
- Server Access is enabled and server the user is establishing a network connection from has different permissions than the test server configured for authentication tests.
- Additional checks are being done based on other criteria such as the users calling telephone number or MAC address.
- Use of custom attribute filters based on specific authorization attributes transmitted by NAS different from those used for authentication test.
- Client use of authentication methods not supported by the stored password format.
- Access server or Emerald client incorrectly configured such as shared secret mismatch or unauthorized management address.

```
Emerald includes a database of RADIUS attributes compatible with most Network
Access Servers (NAS) vendors.  Administrators can manage RADIUS attributes
from Emerald Admin / RADIUS / Vendors.  Please consult NAS documentation for
information on supported RADIUS attributes and configuration requirements.
```

## Timeline

Similar to MBR timeline except only changes affecting the service are displayed.

## Open Service




Previously closed services are re-opened by entering open date reflecting when re-opening of service is to become effective. Open service menu option is only displayed in the event service is currently inactive or closed. Otherwise open can be scheduled regardless of current service status from service timeline. When opening service having one or more child services you will be prompted to include or exclude child services from also being opened with parent service.

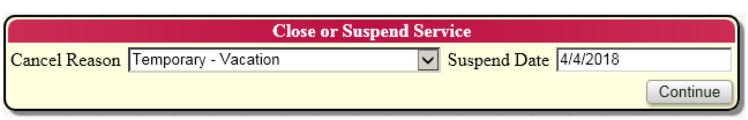
Process of opening a service includes following changes and considerations:

- If service was previously inactivated open automatically causes service to be immediately activated.
- Service resumes invoicing as of later of service billed thru or service open date.
- When re-opened invoices are generally created in advance for recurring service per billing cycle invoice bill days configuration.
- Please take note of any warnings displayed while opening services.

## Close Service

Closing service updates account timeline to reflect service cancellation. In the event service has already been invoiced ahead of cancellation date a reinvoice alert is displayed after closing the service. If alert is displayed and you have finished making changes follow reinvoice link to apply invoicing changes necessary to account for change.

If you will be making additional changes to this or other services the MBR can be reinvoiced later once changes are completed by clicking 'Reinvoice' from MBR Invoices menu.




| Field | Description |
| --- | --- |
| Cancel Reason | When closing service select best matching reason for closure.<br><br>Cancel reasons may be temporary or permanent based on "Temporary" field configured |

<table>
<tr><td></td><td>within Emerald Admin / Sales & Marketing / Cancel Reasons.  See table below for details of important differences between temporary and permanent cancel reasons.<br><br>
<table>
<tr><th>Cancel Type</th><th>Description</th></tr>
<tr><td>Temporary</td><td>Temporary cancel reasons indicate customer is likely to return differing with permanent cancel reasons in the following ways:<ul><li>Temporary rather than permanent service level prorate settings apply when closing service.</li><li>Temporarily canceled services are not eligible to be automatically inactivated.</li><li>Customers may reopen services closed with temporary cancel reason from customer center if allowed.</li><li>Market based ETF fees are not assessed when service closed with temporary reason.</li></ul></td></tr>
<tr><td>Permanent</td><td>Indicates service is to be closed with no expectation of being re-opened again in the future.  Permanent cancel reasons differ with temporary reasons in the following ways:<ul><li>Permanent rather than temporary service level prorate settings apply when closing service.</li><li>Permanently canceled services are eligible to be automatically inactivated once service type "inactivate service" days have passed.</li><li>Customers may not reopen a service once it has been closed with a permanent cancel reason from customer account center.</li><li>Market based ETF fees can only be assessed when service closed with permanent cancel reason.</li></ul></td></tr>
</table></td></tr>
<tr><td>Cancel/Suspend Date</td><td>Represents full day after which service is considered to be permanently or temporarily closed.  Services continue to be available normally until cancel date has passed.<br><br>In some circumstances service expiration date of one or more services may exceed cancellation date in which case service remains active and accessible until expiration date has passed.<br><br>Most typical cause of discrepancy between cancel date and service expiration is service type level proration configured for either "full month" or "no credit".  Since in this case a user may be charged for remaining month or period past configured cancellation account remains accessible for the duration of period paid by customer.</td></tr>
</table>

### Delete Service

Delete service option is permanent and cannot be reversed from Emerald.  Use of this feature is not recommended as a standard account procedure.  We recommend inactivating service rather than deleting them to enable account details to be referenced in the future should it become necessary.  When a service is deleted associated data is retained for historical reporting purposes and deprovisioning external systems.

## BILLING

Billing menu offers access to bulk invoicing and payment related processing. Many of the options available from this menu are able to be automated to run periodically from Emerald scheduler without operator intervention. This includes creation of new invoices and statements, credit card and EFT autopay processing, usage charge rollup and emailing of invoices and statements to customers. For more information on scheduling see Scheduler menu within Emerald Administrators guide.


Post check payments, failed credit card transaction management and statement printing for postal delivery are items requiring operator intervention. These items cannot be automated to run via Emerald scheduler.

| Option | Description |
|---|---|
| Post Payments | Bulk payment facility for efficiently receiving high volumes of check payments. Supports manual data entry with keyboard shortcuts or payment file upload. |
| Create Bills | Preview or create recurring invoices and statements globally or by billing group |
| Send Bills | Email or print for postal delivery existing invoices and statements |
| Credit Cards | View or transmit manual and autopay credit card transactions to real-time transaction gateways for processing or export and import credit card batch request and response files. Failed transactions are also managed from this menu. |
| Bank Trans | View or transmit manual and autopay EFT transactions to transaction gateway for processing or export and import EFT batch request and response files. |
| Failed Transactions | Displays current listing of failed credit card transactions offering options to view related MBRs or void / retry transactions. |
| Usage Charges | View summary of unapplied usage charges from rating system and generate charges for completed usage periods. |

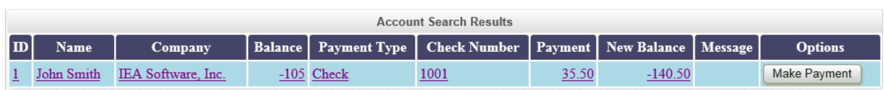
## Processing Checklist

When manually executing billing it is recommended processing occur in the following order to ensure most timely processing and accurate communications with customers. Normally processing is automated via Emerald scheduler requiring little operator involvement.

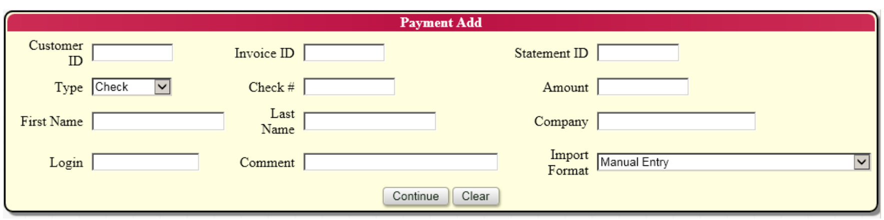
| Step | Comments & Dependencies |
|---|---|
| Creation of pending usage charges. | Creating usage charges 1st prior to invoicing ensures charges related to post-paid usage are available to be rolled into invoices.<br><br>If usage charges are processed after invoices are created then charges appear in either a future interim invoice or customer's next recurring invoice depending on circumstance. |
| Generate recurring invoices from Create Bills / Create Invoices. | Invoicing should be run after all known charge and credit adjustments have been applied to MBRs including processing of usage charges. This ensures generated invoice reflects all known charges and adjustments.<br><br>Charge and credit adjustments created after invoice creation will be rolled into an interim invoice or customer's next recurring invoice depending on circumstance.<br><br>Once invoices have been created it is recommend creating invoices a second time until no new invoices are found to process. Create invoices feature invoices customer for up |

| | |
|---|---|
| | to one pay period each time invoice creation runs. Repeating the process ensures in rare event a customer is behind on invoicing for more than one pay period invoicing for the customer will be caught up. |
| Post all known check and cash payments via MBR or Post Payments menu. | If all known payments are recorded prior to creating statements generated statements will be as up to date as possible. Payments received after statement creation will be reflected in the next statement. |
| Export CC/EFT transactions for all batch processors. | When all known payments are recorded prior to creating statements generated statements will be as up to date as possible. Payments received after statement creation is reflected in the following statement. |
| Generate statements from Create Bills / Create Statements. | Statements should be created after all known payments have been received and all known invoices created to provide the most current snapshot of account activity to the customer.<br><br>New invoices and payments generated after statement creation are rolled into the MBR's next statement. |
| Email and or print Statements from Send Bills. | Once statements are generated they can then be transmitted via Email or Postal delivery to customers. |

## Post Payments




Using post payments operators can quickly post multiple cash or check payments to MBRs. Operators enter search criteria such as an invoice, statement or customer id, payment amount and type. Invoice & Statement barcode scanning and browser hotkeys are supported for rapid payment entry. Clicking search (Or pressing return) displays all accounts matching the search criteria. Once the correct account is located choose "Queue Payment" or "Make Payment" (Browser Hotkey – "P") button in the Action column to queue the payment to the confirmation queue or apply payment directly to the selected MBR. Once this is complete the payment form is displayed once again so that any additional payments can be entered.



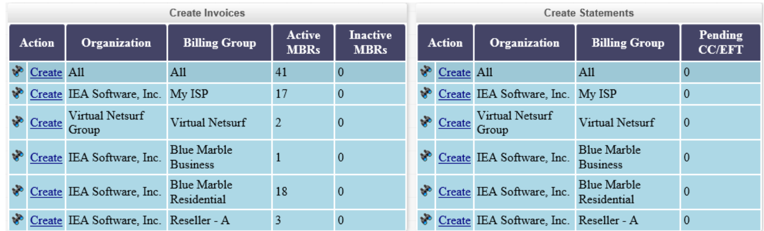

By disabling field visibility location "Post Payments" / "Results / Lists" / "Queue Payment" then "Make Payment" rather than "Queue Payment" appears in the options column of search results. In this mode payments are processed immediately without confirmation. When "Queue Payment" is enabled payments are added to a confirmation list specific to the operator allowing for review prior to posting.

| Field | Description |
|---|---|
| Customer ID | MBR customer number to search (Browser Hotkey – "C") |
| Invoice ID | Invoice number to search (Browser Hotkey – "I") |
| Statement ID | Statement number to search (Browser Hotkey – "S") |
| Type | Payment type (Check or Cash) |
| Check # | Check number entry when payment type is ‘Check’ (Browser Hotkey – "K") |
| Amount | Payment amount (Browser Hotkey – "A") |

<table>
<tr><td>Billing Group</td><td>Limits results to MBRs having selected billing group. This field is hidden by default and is enabled from field visibility location "Post Payments" / "Search Forms" / "Billing Group".</td></tr>
<tr><td>Region</td><td>Limits results to MBRs having selected region. This field is hidden by default and is enabled from field visibility location "Post Payments" / "Search Forms" / "Region".</td></tr>
<tr><td>Billing Cycle</td><td>Limits results to MBRs having selected billing cycles. This field is hidden by default and is enabled from field visibility location "Post Payments" / "Search Forms" / "Billing Cycle".</td></tr>
<tr><td>First Name</td><td>First name of an MBR billing address</td></tr>
<tr><td>Last Name</td><td>First name of an MBR billing address</td></tr>
<tr><td>Company</td><td>Company name of an MBR billing address</td></tr>
<tr><td>Login</td><td>Service login field to search</td></tr>
<tr><td>Comment</td><td>Comment entered into the payments comment field</td></tr>
<tr><td>Import Format</td><td>
<table>
<tr><th>Format</th><th>Description</th></tr>
<tr><td>Manual</td><td>Manual data entry form will be used to record payments. No automatic duplicate payment checking is performed for manual entry. It is recommended CustomerID, InvoiceID or StatementID be entered first as this will cause amount field to be defaulted to current account balance.</td></tr>
<tr><td>CSV - ***</td><td>Uploaded payment file is formatted as comma separated value with no column header with columns arranged per selected Import Format description. On a per-MBR basis both check number and amount must be unique. If an existing payment with same check number and amount exists the entire batch import fails. All fields are required. Format details of each field below.
<table>
<tr><th>Field</th><th>Type</th><th>Example</th><th>Description</th></tr>
<tr><td>CustomerID</td><td>Integer</td><td>3417</td><td>MBR #</td></tr>
<tr><td>InvoiceID</td><td>Integer</td><td>112721</td><td>Invoice #</td></tr>
<tr><td>StatementID</td><td>Integer</td><td>97365</td><td>Statement #</td></tr>
<tr><td>CheckNum</td><td>String</td><td>000001234</td><td>Check Number</td></tr>
<tr><td>Amount</td><td>Money</td><td>3.50</td><td>Check Amount</td></tr>
</table></td></tr>
<tr><td>Emerald v4/v5 compatible fixed width</td><td>Uploaded payment file is fixed width format compatible with payment import feature of previous versions of Emerald. Formatting amount field as Amount * 100 instead of using decimal point is not supported and will result in crediting 100 times intended amount to MBR. On a per-MBR basis both check number and amount must be unique. If an existing payment with same check number and amount exists the batch import fails.
<table>
<tr><th>Field Name</th><th>Size</th><th>Offset</th><th>Format</th></tr>
<tr><td>CustomerID</td><td>12</td><td>1-12</td><td>NNNNN</td></tr>
<tr><td>Amount Paid</td><td>12</td><td>13-24</td><td>NNN.NN</td></tr>
<tr><td>Trans Date</td><td>10</td><td>25-34</td><td>MM/DD/YYYY</td></tr>
<tr><td>Check Number</td><td>10</td><td>35-44</td><td>NNNNN (Not required)</td></tr>
</table></td></tr>
</table></td></tr>
<tr><td>Import File</td><td>Local file accessible to the operator's browser containing payment record file to import formatted per chosen import format selected above. Import field is only visible when import format is not Manual.</td></tr>
<tr><td>Preview</td><td>If checked you will preview the file before it is batched in.</td></tr>
</table>

## Create Bills

This menu provides options for batch processing of [invoices](#) and [statements](#). Invoices and statements are only generated for accounts needing to be created. If invoicing is fully caught up creating invoices results in no new invoices generated. This also applies to statements. Emerald does not create duplicate invoices or statements as a result of clicking create. MBR [billing cycle](#) and service [billed thru](#) dates primarily determine the point in time after which recurring invoices are able to be generated.

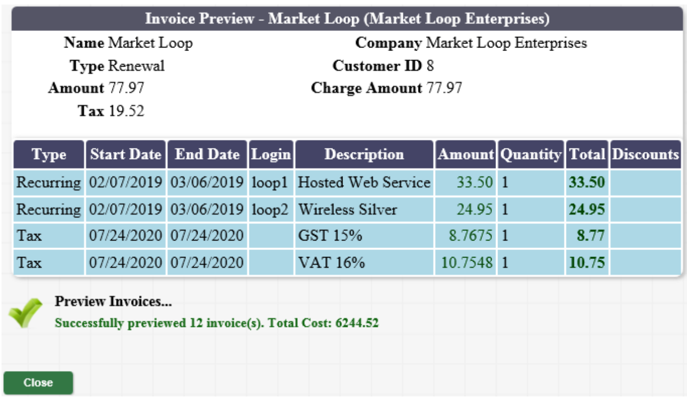


Create Invoices

| Action | Organization | Billing Group | Active MBRs | Inactive MBRs |
|---|---|---|---|---|
| Create | All | All | 41 | 0 |
| Create | IEA Software, Inc. | My ISP | 17 | 0 |
| Create | Virtual Netsurf Group | Virtual Netsurf | 2 | 0 |
| Create | IEA Software, Inc. | Blue Marble Business | 1 | 0 |
| Create | IEA Software, Inc. | Blue Marble Residential | 18 | 0 |
| Create | IEA Software, Inc. | Reseller - A | 3 | 0 |

Create Statements

| Action | Organization | Billing Group | Pending CC/EFT |
|---|---|---|---|
| Create | All | All | 0 |
| Create | IEA Software, Inc. | My ISP | 0 |
| Create | Virtual Netsurf Group | Virtual Netsurf | 0 |
| Create | IEA Software, Inc. | Blue Marble Business | 0 |
| Create | IEA Software, Inc. | Blue Marble Residential | 0 |
| Create | IEA Software, Inc. | Reseller - A | 0 |



Invoice Preview - Market Loop (Market Loop Enterprises)

**Name** Market Loop **Company** Market Loop Enterprises
**Type** Renewal **Customer ID** 8
**Amount** 77.97 **Charge Amount** 77.97
**Tax** 19.52

| Type | Start Date | End Date | Login | Description | Amount | Quantity | Total | Discounts |
|---|---|---|---|---|---|---|---|---|
| Recurring | 02/07/2019 | 03/06/2019 | loop1 | Hosted Web Service | 33.50 | 1 | 33.50 | |
| Recurring | 02/07/2019 | 03/06/2019 | loop2 | Wireless Silver | 24.95 | 1 | 24.95 | |
| Tax | 07/24/2020 | 07/24/2020 | | GST 15% | 8.7675 | 1 | 8.77 | |
| Tax | 07/24/2020 | 07/24/2020 | | VAT 16% | 10.7548 | 1 | 10.75 | |

Preview Invoices...
Successfully previewed 12 invoice(s). Total Cost: 6244.52

Close

Binocular icons directly to left of "Create" in Action column are used to preview the creation of invoices and statements. This is very useful especially when Emerald is initially placed in service to verify batch run before the billing run is recorded and actual invoices or statements are created within the system. A summary of current billing run will be presented for review. Data presented is non-editable and for display purposes only.

If changes need to be made to correct a batch run they can be made in MBRs, and Admin configurations such as service type pricing as necessary to resolve whatever problems are discovered during preview before creating invoices or statements. Invoice creation cannot be undone. If necessary affected invoices can be manually voided and reissued from [MBR invoices](#) menu or the batch manager located within general admin menu.

"Create" button generates any invoices or statements needing to be created at present.

The first row having an organization and billing group of "All" allow invoices and statements to be created or previewed for all billing groups throughout Emerald.

Active MBRs and Inactive MBRs represent the total number of both Active and Inactive MBRs assigned to each billing group. This is for informational purposes only and does not reflect number of pending invoices or statements.

Billing Groups in statements having a red background have MBRs with CC/EFT transactions that are pending. It is recommended all pending CC/EFT transactions be processed prior to creation of statements. This allows all known payment information for the customer to be reflected in their new statement in addition these payments could prevent late fees from being unnecessarily assessed against the customer. For more information on recommended ordering of billing processes see [processing checklist](#) above.

> To generate invoices or statements for specific MBRs instead of global or group basis see [MBR invoices](#) and [MBR statements](#).

## Send Bills

Once invoices or statements have been created they are available for printing for postal delivery and emailing for electronic delivery from this menu. Options in the send bills menu are only visible when there are one or more items to be printed or emailed. If no items are pending nothing is displayed within this menu.

## Invoice & Statement Print Queue

Invoice & Statement Print Queue

| ID | Type | Date | Operator | Billing Group | Items | Total | Comments | Status | Action | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Print Statement | 10/20/2016 09:44:41 | admin | My ISP | 2 | 118.50 | N/A | Open | Print | Mark Sent |
| 24 | Print Statement | 05/27/2020 16:39:22 | admin | My ISP | 13 | 12806.08 | N/A | Open | Print | Mark Sent |
| 13 | Print Invoice | 03/27/2017 18:09:11 | admin | My ISP | 10 | 13308.94 | N/A | Open | Print | Mark Sent |

Invoice and Statement print queue displays all invoices and statements queued for printing. Items are added to the print queue by choosing the "Add and Print" or "Add Queue" links from the "Print – Statement" and "Print – Invoice" menus shown below. Once in the queue operators can choose "Print" to display the print batch for printing. Once a batch has been successfully printed it is marked as having been sent by choosing "Mark Sent". Once marked the batch is removed from display and is no longer available for printing. If necessary marked batches can be restored from the batch manager in Emerald Admin / General menu.

By clicking on comments field you notes may be left detailing any special instructions for handling of a batch.

When printing invoices and statements via web browser it is necessary to prevent browser from including any headers and footers that would interfere with printing. In some environments this is done from the "File / Page Setup" menu within the web browser. Some browsers such as Microsoft Internet explorer also disable printing of some HTML elements that can serve to improve the look of invoice and statement reports. Printing of shaded areas in invoice and statement reports can be enabled in Microsoft Internet Explorer by enabling the "Tools" / "Internet Options" / "Advanced" / "Printing" / "Print background colors and images" option.

## Printing

Print - Statement

| Organization | Billing Group | Items | Total | Action | |
|---|---|---|---|---|---|
| Virtual Netsurf Group | Virtual Netsurf | 1 | 100.50 | Add and Print | Add Queue |
| IEA Software, Inc. | Blue Marble Residential | 1 | 0.00 | Add and Print | Add Queue |
| IEA Software, Inc. | Reseller - A | 1 | 15.17 | Add and Print | Add Queue |

Print statement and print invoice menu includes any items with MBR send method having printing enabled such as "Postal Mail" not yet marked as sent. Invoice and statement batches are displayed on a billing group basis. "Add and Print" adds batch to print queue and presents invoices or statements for printing. The "Add Queue" option adds batch to "Invoice & Statement Print Queue" immediately without presenting statements for printing.

## Emailing

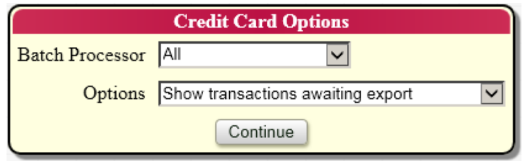
Email statement and email invoice menu includes any items with MBR send method having emailing enabled such as "Email HTML" not yet marked as sent.

Email - Statement

| Organization | Billing Group | Items | Total | Action | |
|---|---|---|---|---|---|
| IEA Software, Inc. | My ISP | 1 | 0.00 | Email | Email Preview |
| IEA Software, Inc. | Blue Marble Business | 1 | -24332.10 | Email | Email Preview |
| IEA Software, Inc. | Blue Marble Residential | 15 | 425.00 | Email | Email Preview |
| IEA Software, Inc. | Reseller - A | 2 | 97.36 | Email | Email Preview |
| All | All | 19 | -23809.74 | Email | Email Preview |

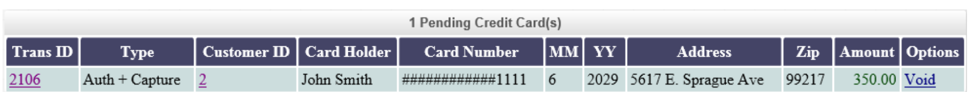
Invoice and statement email batches are displayed on a billing group basis.  Additionally "All" group sends pending emails for all billing groups in one operation.  "Email Preview" action takes all steps the system would normally including report rendering and displays a summary of emails it would have sent but does not actually send out email messages.  "Email" action sends out Statements via Email and marks them as sent provided SMTP response indicates successful delivery.  Any delivery failures are displayed and email delivery is retried the next time "Email" action is chosen.

## Credit Cards & Bank Trans




Electronic payments are managed from the "Credit Cards" and "Bank Trans" menu options of the Billing menu.  All options within these menus can apply to all assigned batch processors for processing or a specific batch processor based on the Batch Processor selection list as shown in this image.  If a specific batch processor is selected all exports, imports and results are restricted to the specified batch processor.  Operators without global access are limited to only those batch processors and accounts they have access.

### Show transactions awaiting export



1 Pending Credit Card(s)

| Trans ID | Type | Customer ID | Card Holder | Card Number | MM | YY | Address | Zip | Amount | Options |
|---|---|---|---|---|---|---|---|---|---|---|
| 2106 | Auth + Capture | 2 | John Smith | ############1111 | 6 | 2029 | 5617 E. Sprague Ave | 99217 | 350.00 | Void |

Pending transactions are added when manual CC or EFT payments are made from the operator or customer interface or after a new invoice is created for customers with a pay method of Credit Card or Bank Transfer.  Transactions appearing in this menu have not yet been exported to the payment processor.  Choosing the "Export Transactions" option from "Options" selection list will cause pending transactions to be exported.

### Show transactions awaiting import

This option is not applicable to systems using real-time batch processing.  Non real-time batch processors using batch files to process payment transactions operate in two steps.  First transactions are exported to a batch file used by the payment processor by choosing the "Export Transactions" option from the Options selection list.  Next after all transactions have been processed the result file from the payment processor is imported into Emerald using the "Import transactions" option.  The transactions awaiting import list shows all of those transactions exported in the first step that have not yet had their results imported into Emerald.  It is recommended that transactions be imported as soon as possible after an export.  It is also very important all transactions be accounted for.  The awaiting import transactions listing should not show any outstanding transactions after all results from the payment processor have been imported.  Outstanding transactions can lead to the following situations necessary to prevent potential double billing of an account:

- New statements will not be created for MBRs having any outstanding "awaiting import" transactions.

- Amounts of any automatic credit card payments made against an invoice will have the outstanding transaction amount subtracted from it.

To clear any awaiting import transactions found after all results from the payment processor have been imported check to see if the transactions shown have actually been processed. If not void these transactions from the actions column and create any new credit card payments for the MBR as necessary. If transactions were processed then generate an import file in the payment processor to account for these payments and import the results using "Import transactions" option. If this is not possible you may want to consider manually creating a matching result file or adding a payment or adjustment manually to cover the amount paid. "Awaiting import" transactions should be imported or voided as soon as possible.

## Show Failed Transactions

Failed Transactions

| Date | Processor | Type | Name | Company | Transaction Amount | Current Balance | Account | Result | Retries | Actions | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 03/27/2017 17:35:13 | Test Authorize.Net | Auth + Capture | John Smith | IEA Software, Inc. | 74.95 | -105.00 | ############1111 | | None | Void | Retry |
| 09/03/2019 13:01:17 | Test Authorize.Net | Auth + Capture | John Smith | IEA Software, Inc. | 406.09 | -105.00 | ############1111 | | None | Void | Retry |

All transactions not having been approved either because of an error found in the data provided, an error reported by the payment processor or a declined transaction due to insufficient funds are shown in the failed transactions list. Automatically created transactions for MBRs with pay methods of "Credit Card" or "Bank Transfer" can be manually retried by choosing the "Retry" action or automatically retried based on the "Rebatch Tries" and "Rebatch Interval" options assigned to the batch processor being used. Credit Card and Bank Transfer payments created manually must be voided and then new payments posted after the reason for the initial transaction failure has been corrected. The external payment processor generates error messages displayed in the result field please see your payment processors documentation for more information on errors displayed and the steps necessary to resolve them.

Emeralds failed transactions list also displays transactions requiring manual confirmation before the transaction can be exported. The following are reasons for manual confirmation:

- Pay Period has Confirm auto CC/EFT enabled and MBR has a pay method of "Credit Card" or "Bank Transfer"
- A duplicate payment amount was detected when adding an automatic transaction for MBRs with a pay method of "Credit Card" or "Bank Transfer". The duplicate must be manually reviewed to prevent double billing of the account. Duplicate payment protection options are configurable via the "Emerald Admin" / "Accounting" / "Settings" menu.

## Export and create transactions

This action first creates any necessary autopay transactions and then takes all new and previously pending payment transactions and exports them to the payment processing system. While exporting transactions for Real-time batch processors transactions are automatically imported as export proceeds. Only transactions exported to batch files for later processing use "Import transactions" to import transaction results after having been processed by the external payment processor.

If no specific batch processor is chosen the export process applies to all C and EFT batch processors system wide that have not been disabled and have pending transactions.

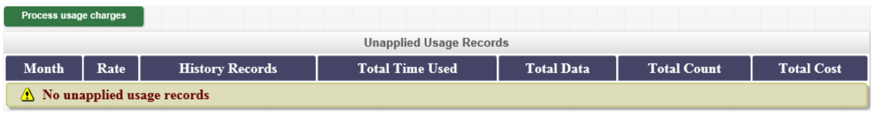
The Emerald task scheduler handles all export transactions. Once an export is scheduled a popup window showing the current status of the export is displayed. Transactions exported to batch files are stored in the location specified in the configuration of the batch processor local to the server running the Emerald task scheduler. For reference the server's network hostname is displayed in the Server column.

## Import transactions

After transactions are exported to a batch file and processed by external payment processor results file from payment processors are imported into Emerald recording disposition of each transaction. Import transactions process is used only with non-real-time batch processors using batch files. Batch processors supporting real-time processing of payment transactions do not use the import transactions menu.

Emerald task scheduler handles all import transactions. Batch input file configured in Emerald batch processor (See "Emerald Admin" / "Accounting" / "Batch Processors") must be placed in import file accessible from server running Emerald task scheduler.

## Usage Charges




Monthly usage charges generated from rating RADIUS call records, network traffic and external sources are generated system wide by clicking "Process usage charges". It is recommended usage charges be processed before creating invoices (see processing checklist) to enable usage charges to appear with new invoices.

| Column | Description |
|---|---|
| Month | Shows number of months back from the current date of the start of the usage period. Generally entries showing 0 and sometimes 1 will remain after processing usage charges. This is normal as the monthly period plus the delay period (See "Emerald Admin" / "Accounting" / "Settings" / "Rating Charge Delay") has not yet been reached. Additional data could still be recorded before closing the period and creating usage charges. |
| Rate | The name of the rate responsible for the usage. See "Admin" / "Rating" / "Rates" |
| History Records | Number of rate history records assigned to this rate. Generally this reflects the number of accounts having usage records. |
| Total Time Used | Sum of seconds used by this rate. |
| Total Data | Sum of data or units used by this rate. |
| Total Count | Sum of data or unit intervals used by this rate. |
| Total Cost | Total cost for all users of this rate. |

# SUPPORT

Support provides search capability for previously recorded incidents, management of customer affecting events such as a service outage and facility for sending customers one time Email and SMS announcements.

## Incidents

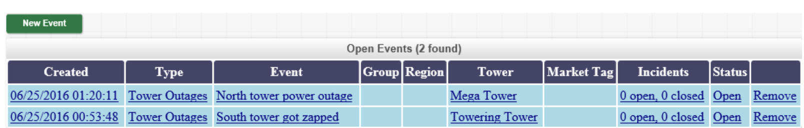

Entering data into search form restricts search results to only those incidents where all entered search criteria have matched. Results are also restricted by global and operator group specific limits on number of search results that can be displayed. In some cases it may be necessary to narrow search criteria to ensure all incidents of interest are presented or to have administrator lift search limits from Emerald Admin / Web Interface / Operator Limits.

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Incident ID</td><td>Unique incident id number. When searching by Incident ID please take care to clear other search criteria that may interfere with search.</td></tr>
<tr><td>Created After</td><td>Restricts search to incidents initially created after start of specified date</td></tr>
<tr><td>Created Before</td><td>Restricts search to incidents initially created prior to start of specified date</td></tr>
<tr><td>Show</td><td>Search by current status of the incident as generally determined by current incident state.
<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>Open incidents</td><td>All incidents have not yet been resolved or closed. This includes any incident state with "Status Open" set Yes.</td></tr>
<tr><td>Closed incidents</td><td>All incidents having been resolved or closed. This includes any incident state with "Status Open" set No.</td></tr>
<tr><td>Escalated incidents</td><td>Incidents having an "escalated" state. Escalated incidents may reflect a question from an important customer or a complex question that needs to be answered by another tier of operators.</td></tr>
<tr><td>Late incidents</td><td>Open incidents having passed either a specific due date set on a per incident basis or has been open longer than the allowed "Overdue Days" defined for the incidents type. (See "Admin" / "Incidents" / "Incident Types")</td></tr>
<tr><td>Waiting for client</td><td>An incident having a state indicating the incident cannot be proceed any further because operators are waiting for an action, payment or additional information to be provided by customer.</td></tr>
<tr><td>Archived incidents</td><td>Archived incidents reflected incidents having an archived state and are used primarily for the storage of knowledge base or reference articles.</td></tr>
<tr><td>Open appointments</td><td>Open incidents configured as scheduled appointment</td></tr>
<tr><td>Closed appointments</td><td>Closed incidents configured as scheduled appointment</td></tr>
</table></td></tr>
<tr><td>Appointment After</td><td>Restrict search to appointments scheduled after start of specified date</td></tr>
<tr><td>Appointment Before</td><td>Restrict search to appointments scheduled prior to start of specified date</td></tr>
<tr><td>Assignment</td><td>Restricts search to show incidents assigned to or by you. Incidents assigned to you also include incidents assigned to a role you are a member of who have either been escalated or are overdue if your role membership subscribes to overdue or escalated incidents. Depending on operator group rights you may also be able to select incidents assigned specifically to other operators.</td></tr>
<tr><td>Incident Type</td><td>Restricts search by type of incident</td></tr>
</table>

| | |
|---|---|
| Incident State | Restricts search to incident state. Incident type must first be selected before an incident state can be chosen. |
| Appointment Type | Restrict search to appointments of given type. |
| Appointment Time | Time block of appointment (e.g. morning, afternoon, evening). Appointment type must first be selected before a time block can be chosen. |
| Billing Group | Restrict search to MBR billing group. See Account Hierarchy |
| Region | Restrict search to MBR region |
| Market Tag | Restrict search to MBR or service market tag. See Market Tags |
| (Full-Text) Search | If full text search capability is installed and available to the database server search field is labeled "full-text search" and one or more search keywords may be entered separated by space. Returned search results are ranked by relevance according to how closely matching documents match one or more search keywords.<br><br>Due to processing requirements full text indexes are only updated a few times throughout the day. It may take several hours before changes to existing or new incidents are available for search using the full text search.<br><br>If full text search feature is unavailable then search field is labeled "Search" and a substring search of a single keyword or phrase is performed instead of full text search involving any number of keywords. Substring searches are slower and less capable than full text search. |
| Additional Custom Data Fields | When an incident type is selected any custom incident data fields associated with that type are also displayed to further restrict search criteria. |

For more information about managing incidents returned in search results please see Incidents under concepts and definitions.

## Events

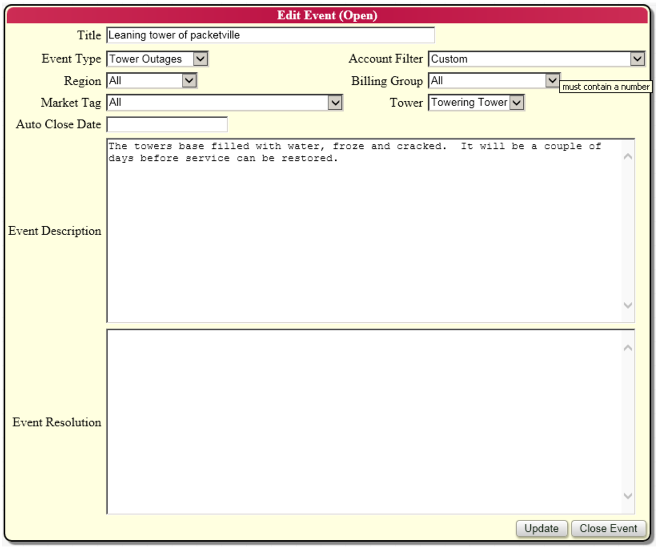

New Event

Open Events (2 found)

| Created | Type | Event | Group | Region | Tower | Market Tag | Incidents | Status | |
|---|---|---|---|---|---|---|---|---|---|
| 06/25/2016 01:20:11 | Tower Outages | North tower power outage | | | Mega Tower | | 0 open, 0 closed | Open | Remove |
| 06/25/2016 00:53:48 | Tower Outages | South tower got zapped | | | Towering Tower | | 0 open, 0 closed | Open | Remove |

Events represent conditions likely to affect multiple customers. Common examples of events include service outages caused by hardware failure or power outage. Events serve two primary functions:

- To notify customer service operators of potentially service affecting conditions. Once an event is created notification is displayed in the Infobar of Emerald client and an alert displayed within status area of any MBRs likely to be affected by an event alerting operators to known issues.
- To group all incidents related to an event. Following event alert hyperlink within the MBR automatically opens a new event linked incident. Linkage enables operators to close or change all related incidents in a single operation once the event has been resolved or changed. Event linking can also be used for reporting or to allow custom bulk Email or SMS announcements to customers having incidents linked to an event.




| Field | Description |
|---|---|
| Title | Unique label describing this event |
| Event Type | Event types are managed from Incidents & Schedules menu of Emerald Administrator. Not all event types may be selectable by all operators. |
| Account Filter | When an account filter is selected this event is applicable to accounts matching the filter criteria. Selecting a filter removes Region, Billing Group, Market Tag and Tower filters of the event form from availability. |
| Region | Restricts applicability of event to MBRs with matching region |
| Billing Group | Restricts applicability of event to MBRs with matching billing group |
| Market Tag | Restricts applicability of event to MBRs or Services where matching market tag is active |
| Tower | Restricts applicability of event to MBRs with one or more services assigned to matching tower |
| Auto Close Date | When an event is opened auto close determines start of day to consider this event closed. Once closed the event no longer appears as an active event in Infobar or MBR status menu. When auto close date is reached status of any incidents assigned to event is not automatically changed. Closing related incidents still requires manual operator action. |
| Event Description | Text detailing event including any relevant contacts, estimates and technical details. |
| Event Resolution | Contains text detailing resolution once event has been resolved |

Once an event is created clicking on the event includes a listing of all incidents currently assigned to the event.

## Bulk Email

Bulk mail is used to transmit announcements via Email or SMS to customers. Common examples include sending notices of planned outages, notification of new service offerings, upgrade offers, changes to pricing and corporate announcements.

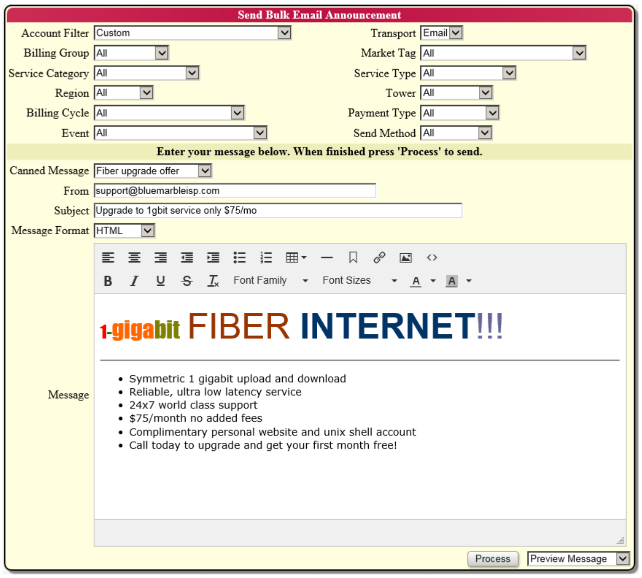
Process of sending bulk message includes following steps:

- Select whether Email or SMS transport is to be used for message delivery
- Define criteria limiting message to MBRs with matching configuration
- Enter subject and body of your message

- Preview recipients, send message or export distribution list for external processing

In addition to search criteria defined below bulk messages are further restricted to customers where "Announcement" purpose within address Email or SMS notification is enabled. Customers may control whether they receive bulk mail announcements from "Manage Account" / "Change billing address and notification settings" within Customer Account Center.

All filters including service level specific filters work to locate MBRs having matching criteria. Once an MBR is matched distribution of announcements is always performed at the MBR level rather than subset of services within MBRs matching service level filters such as a specific service type or service category.




<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Account Filter</td><td>Predefined matching filter restricting recipients to customers matching filter criteria. When a filter list is selected all other search fields in the bulk messaging form become unavailable. Account filters are managed from "Emerald Admin" / "General" menu. Please see Administrators guide for more information.</td></tr>
<tr><td>Transport</td><td>Determines technology to be used for bulk message delivery.<br><table><tr><th>Transport</th><th>Description</th></tr><tr><td>Email</td><td>Announcement is to be sent via SMTP / E-Mail restricted to customers with "Announcement" Email Notification enabled in one or more address record.</td></tr><tr><td>SMS</td><td>Announcement is to be sent via SMS Poller / SMS restricted to customers with "Announcement" SMS Notification enabled in one or more address record. Additionally notification must be transmitted within customer's allowed SMS Hours if defined.<br><br>When SMS is selected character count is displayed. Please be mindful of applicable SMS message length restrictions.</td></tr></table></td></tr>
<tr><td>Billing Group</td><td>Account match criteria: MBR billing group</td></tr>
<tr><td>Market Tag</td><td>Account match criteria: Market tag currently active at MBR or service level</td></tr>
<tr><td>Service Type</td><td>Account match criteria: Service level service type</td></tr>
<tr><td>Service Category</td><td>Account match criteria: Service level service category</td></tr>
<tr><td>Region</td><td>Account match criteria: MBR level region</td></tr>
<tr><td>Tower</td><td>Account match criteria: Service level tower assignment</td></tr>
</table>

<table>
<tr><td>Billing Cycle</td><td>Account match criteria: MBR level billing cycle</td></tr>
<tr><td>Payment Type</td><td>Account match criteria: MBR level payment type</td></tr>
<tr><td>Event</td><td>Account match criteria: Events assigned to one or more Incident within MBR</td></tr>
<tr><td>Send Method</td><td>Account match criteria: MBR level send method</td></tr>
<tr><td>Canned Message</td><td>When one or more canned messages are configured from "Emerald Admin" / "Messaging" / "Canned Messages" selecting a canned message overwrites from, subject, message format and message fields with contents of selected canned message.  Once a canned message is chosen its text can be customized as need prior to sending a bulk Email or SMS announcement.</td></tr>
<tr><td>From</td><td>Represents "From" address of email message.  Field required when sending via Email.</td></tr>
<tr><td>Subject</td><td>Represents "Subject" line of email message.  Field required when sending via Email.</td></tr>
<tr><td>Message Format</td><td>Regardless of email format selected UTF-8 character encoding is used for all outgoing emails.  It is recommended E-Mail servers support 8-bit mime to ensure UTF-8 compatibility.<br><br>
<table>
<tr><th>Format</th><th>Description</th></tr>
<tr><td>Plain Text</td><td>Plain text is universally supported by all mail systems.</td></tr>
<tr><td>HTML</td><td>HTML provides more formatting options vs plain text.  When HTML is selected HTML editor interface presented is determined via "Emerald Admin" / "Web Interface" / "Operator Settings" / "HTML Editor".<br><br>If none of the included HTML editors are used and HTML tags are entered manually please consider some E-Mail clients support only a small subset of HTML features found in current web browsers when rendering HTML formatted email messages.</td></tr>
</table></td></tr>
<tr><td>Message</td><td>Body of Email or SMS message transmitted to customer.<br><br>The following variables substitutions per table below are supported within message body of SMS and Email messages.  Following example demonstrates customizing each message with name of MBR billing contact.<br><br>
Hello $FirstName $LastName,<br>
…<br>
…<br>
…<br><br>
<table>
<tr><th>Variable</th><th>Description</th></tr>
<tr><td>$FirstName</td><td>First Name field from primary billing address of MBR</td></tr>
<tr><td>$LastName</td><td>Last Name field from primary billing address of MBR</td></tr>
<tr><td>$Company</td><td>Company field from primary billing address of MBR</td></tr>
</table></td></tr>
<tr><td>Process Options</td><td>Determines what occurs as a result of clicking process.<br><br>
<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>Preview Message</td><td>When selected a listing of all recipients is displayed however no email messages are transmitted.  Often used to test search criteria making sure intended recipients are listed.</td></tr>
<tr><td>Send Message</td><td>When chosen a copy of the message is sent to each recipient.  In the case of Email sending occurs immediately with feedback displayed throughout the process and cannot be aborted.  Messages sent via SMS are queued for transmission via SMS poller as soon as possible.</td></tr>
<tr><td>Download Contacts</td><td>Creates a downloadable distribution list file formatted as single field csv file containing one Email address per line or one destination phone number per line in the case of SMS transport.</td></tr>
</table></td></tr>
</table>

## Appointments

Appointment manager offers a global calendar of scheduled appointments optimized for allocation of work items to operators.   All assignment changes are applied immediately upon change without any subsequent save or confirmation steps.


| Field | Description |
|---|---|
| Appointment Type | Selects the global calendar (scheduling resource) to be managed. |
| Starting | Date at the start of which open appointments should begin to be displayed.  Open appointments prior to starting date are filtered from view and not displayed. |
| Days | Number of days from starting date to display scheduled appointments.  By default 1 week ahead from starting date is displayed. |
| Assignment | Selects operator responsible for completing the appointment.<br><br>Avalibility of operators for assignment in this interface is not constrained by time, parallel assignment and distance limits normally enforced for automatic assignment.  It is assumed those managing assignments are fully aware of all relevant constraints.<br><br>If the appointment is assigned to a role then selection of operators is limited to role members.  If appointment is not role assigned then selection of operators common to all active operators assigned the scheduling resource (appointment type) are provided for consideration.<br><br>Depending on configuration assignment selection includes the following details specific to the operator, day and time block. |

| Information | Description |
|---|---|
| Operator | Operator username |
| Distance | Crow flies distance and direction from operators site to the service address of customer associated with appointment. |
| Quantity | Number of appointments currently assigned to this operator within the current day and time block.  If other appointments are assigned in different days or time blocks quantity is not affected. |
| Time | Total sum of time units across all appointments currently assigned to the operator within current day and time block.  If other appointments are assigned in different days or time blocks time unit count is not affected.<br><br>Time units are a realitive metric of how long a specific appointment is expected to take vs how much time is available within a time block.  The display x/y reflects current sum of time units (x) and the defined limit of time units for the present time block (y). |

| | | |
|---|---|---|
| | | Time units are defined at the incident type level while per time block limits are defined within Emerald Admin / Incidents & Schedules / Scheduling Resources or per operator. (Emerald Admin / Security / Operators) Operator block limits if configured take precidence over scheduling resource level block limits. |

## REPORTS

Reports offer insights into overall operation of system and account activity across all components and features of the Emerald Management Suite.


### Online

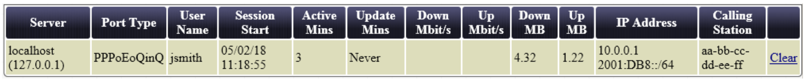
Online displays details about currently active RADIUS authenticated sessions.


Data displayed within online list is also used to enforce concurrent access restrictions and by Emerald session management server. Depending on configuration displayed sessions may include authentication via databases external to Emerald or proxied from third party providers with roaming relationships.

Accuracy of data displayed depends on complete and timely receipt of RADIUS accounting from all access servers. If RadiusNT/X, Emerald database server or network connectivity to the access server have been unavailable for a period of time "Emerald Admin" / "RADIUS" / "Clear Online List" can be used clear sessions from online list making sure concurrent access limits are properly enforced.

Where RADIUS dynamic authorization is supported operators can administratively disconnect active sessions from the online report as needed. See options column below for details.

Availability of information can vary by access technology and capabilities of each access server. Data fields shown are managed via "RADIUS online list" field visibility settings. A number of fields are hidden from view by default.



| Server | Port Type | User Name | Session Start | Active Mins | Update Mins | Down Mbit/s | Up Mbit/s | Down MB | Up MB | IP Address | Calling Station | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| localhost (127.0.0.1) | PPPoEoQinQ | jsmith | 05/02/18 11:18:55 | 3 | Never | | | 4.32 | 1.22 | 10.0.0.1 2001:DB8::/64 | aa-bb-cc-dd-ee-ff | Clear |

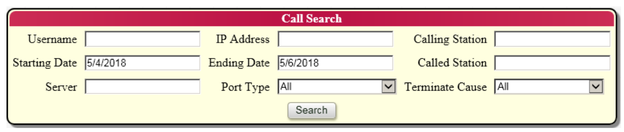
| Column | Description |
|---|---|
| Server | Shows the name of the RADIUS client that sent the RADIUS request accounting request as well as the NAS-IP or NAS-Identifier data identifying the access server enclosed in parentheses. |
| Port | Physical or virtual port session is attached on access server |
| Port Type | Describes access technology used by the session |
| User Name | Login name entered by user to initiate network session. Names that have hyperlinks to accounts have been correlated with an Emerald account using either RADIUS Class attribute, RadiusNT/X virtual class feature or based on a user name match if Class data is not available. |

| | |
|---|---|
| Session ID | Unique access server generated session identifier |
| Session Start | Date and time session was established |
| Delay | Delay in seconds between start of session and when accounting data for session was successfully transmitted to RADIUS server. No data present generally indicates queue delay of less than a second. This field is reported by access server and does not include subsequent queue time necessary to upload accounting data from RadiusNT/X to Emerald. |
| Active Mins | Displays the current duration of the session in minutes. A minute value enclosed in brackets represents the duration since the last interim accounting refresh of the session. |
| Update Mins | If RADIUS interim accounting is transmitted from access server then this field displays time elapsed since receipt of last interim accounting update. If no interim data has been received to date for this session "Never" is displayed. |
| Down Mbit/s | Average download data rate in megabits per second as calculated between last two interim accounting updates. If interim data is unavailable then this field remains empty. |
| Up Mbit/s | Average upload data rate in megabits per second as calculated between last two interim accounting updates. If interim data is unavailable then this field remains empty. |
| Down MB | Megabytes downloaded for this session as of latest interim accounting update. If interim data is unavailable then this field remains 0 or empty. |
| Up MB | Megabytes uploaded for this session as of latest interim accounting update. If interim data is unavailable then this field remains 0 or empty. |
| IP Address | Internet Protocol IPv4/IPv6 addresses and prefixes assigned to this user's session. |
| Calling Station | Network identifier of user's access device. Commonly MAC address of users access equipment. In telephony applications represents user's telephone number. |
| Called Station | Network identifier of attachment point within access server. In telephony applications represents dialed number. |
| Connect | Information regarding speed or type of the connection |
| Auth | Indicates authentication was authorized by Emerald. Normally most sessions should have authorized field set "Yes".<br><br>When "No" this generally indicates RADIUS authentication has failed due to reaching an account limit such as service expiration or time/data allowance and rather than reject authentication failure attributes were transmitted to allow this session to proceed with limited authorization restricting normal access.<br><br>Unauthorized sessions are ignored for purpose of concurrency enforcement and session manager.<br><br>A session may also appear unauthorized in any of the following circumstances:<br><br>• Access server does not support "Class" attribute and local class attribute correlation is disabled in advanced menu of RadiusNT/X Administrator or correlation has failed.<br>• Session was authenticated from an external database such as users file, LDAP or external RADIUS server.<br><br>Sessions appearing with normal aqua color background are authorized. Unauthorized sessions appear with gold warning background color in the online list. |
| Options | Available options to manage sessions appearing in the online list depend on system configuration. |

| Option | Description |
|---|---|
| Clear | This option only removes a session from appearing in the online list. The session itself is not affected by clearing. If session is connected clicking clear does not cause disconnect.<br><br>If a session is cleared and the session is still active and interim accounting is enabled then any cleared sessions will automatically be restored to the list |

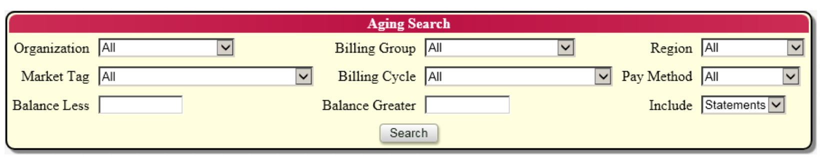
| | | |
|---|---|---|
| | | upon receipt of next interim accounting update.<br><br>If necessary all sessions can be cleared for specific access servers or globally from "Emerald Admin" / "RADIUS" / "Clear Online List". |
| | Disconnect | Causes session to be physically disconnected forcing user to attempt to re-authenticate in order to continue service. In order for session disconnect to work all of the following is required:<br><br>• Access server supports RADIUS initiated disconnect messages (RFC5176).<br>• Address and shared secret of the Emerald server has been configured in the access server to authorize dynamic authorization requests from Emerald.<br>• Disconnect setting in the access server entry (" Emerald Admin" / "RADIUS" / "Access Servers") has been defined with CoA/Disconnect port of the access server. |

## Call Search




RADIUS accounting data for completed sessions is searchable from this form. Search results appearing with gold warning background indicate starting data for the session was missing at time of receipt. Search result columns are similar to online report described above. Availability of information can vary by access technology and capabilities of each access server. Data fields shown are managed via "RADIUS call search" field visibility settings. A number of fields are hidden from view by default.

## Aging




Aging provides current MBR aged balance information for invoices.

When "Include" field is "Statement" display is limited to only those invoices having been rolled into statements. When "Include" field is "All" display includes contributions of all invoices including those not yet rolled into statements. By default this report includes all active MBRs with a nonzero account balance.

While hidden by default the "As Of" search field allows entry of a date in time to present aging as it was on a specified date in the past. When a date is entered results include data from all MBRs including previously inactivated and deleted accounts that would have had a non-zero balance at the time regardless of active status of MBR. Finally when an "As Of" date is entered the "Include" field is assumed to be "All'.

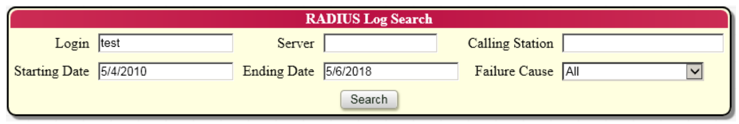
The "As Of" search field can be enabled from field visibility location "Aging report" / Search Forms / "As Of".

| Column | Description |
|---|---|
| Name | MBR billing address First and Last Name |

| | |
|---|---|
| Company | MBR billing address Company |
| Current | MBR current balance.  Does not include pending "realtime" postpaid usage not yet rolled into charges. |
| 0 | Balance owed between last 0 and 29 days |
| 30 | Balance owed between last 30 and 59 days |
| 60 | Balance owed between last 60 and 89 days |
| 90 | Balance owed between last 90 and 119 days |
| 120 | Balance owed for last 120 or more days |

## RADIUS Logs

Unsuccessful RADIUS authentication attempts are searchable from this report to assist customer support to determine cause of authentication failure.



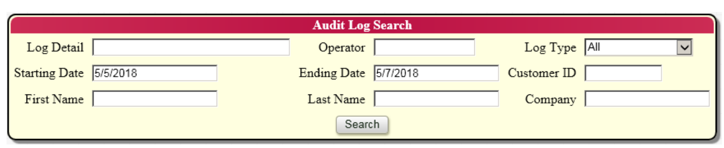

Duplicate instances of authentication errors produced by the same user having same failure cause over a short period of time are periodically suppressed from the list.  Actual number of authentication attempts for a user may be much higher than apparent in the search results.

Table below contains failure details and troubleshooting hints for each type of authentication failure.

| Failure Cause | Description |
|---|---|
| Generic Error | An error occurred while processing EAP authentication request.  Data field will normally contain additional error details. Generic error is often a temporary condition that can be resolved by trying again later. |
| User Not Found | Username was not found in any configured authentication database |
| Bad Password | Username was found in an authentication database however password provided by user did not match the password on file.  When using PAP, EAP-TTLS-PAP or (P)EAP-GTC the entered password is displayed in the data field.  For all other protocols entered password cannot be determined therefore the authentication protocol used is displayed instead of password. |
| User Expired | Indicates service expire date has been reached.  This typically occurs when invoice for continuing service is not paid before start of the customers next billing month. |
| User Overdue | Balance based usage limits are being enforced and current real-time account balance exceeds MBR credit limit. |
| Over Login Limit | This account is currently already logged in the maximum allowed number of login times as configured in service login limit.  See online report for details of currently active sessions related to this user. |
| No Time Left | Total session time as displayed in service time left field has been exhausted. |
| Port Not Allowed | Server access is configured for the authenticating access server and user is attempting access from an unauthorized service type or access time of day limitations are in effect. Configuration is managed via "Emerald Admin" / "RADIUS" / "Access Servers" / … / "Access Settings". |
| Reject Attribute | One or more attribute values of RADIUS authentication request match one or more attributes configured in the attribute reject list.  Rejects are managed via "Emerald Admin" / "RADIUS" / "Reject Attributes" |
| Check Attribute | One or more check attributes were configured for a service and attributes of RADIUS authentication request contain one or more attributes matching one or more check attributes where attribute value is unmatched.  Service check attribute configuration is visible from the services RADIUS menu. |

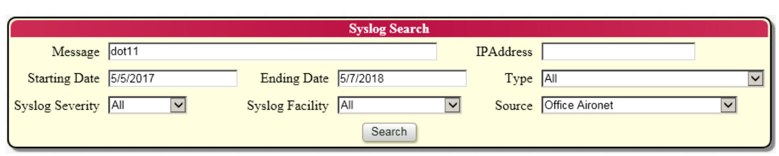
| | |
|---|---|
| | This failure can occur due to misconfiguration when an operator mistakenly set RADIUS attribute type field to "Check" rather than "Reply". |
| User Inactive | Indicates the MBR active field and or service level active field has been disabled or the MBR or service have been deleted. |
| Start Date not reached | Starting date of the service is in the future. This normally occurs when a closed service is scheduled to be re-opened at a future date. If necessary a closed service can be scheduled to open sooner from open service menu option. |
| Rating Reject | Advanced configuration of a rule set executed by one or more rates assigned to this service has matched a condition denying authentication. Data field normally contains additional operator provided information explaining cause of reject. Rule sets are configured from "Emerald Admin" / "Rating" menu. |
| Rating Failure | Indicates an exceptional condition occurred while evaluation rating rules for purpose of service authorization. Rating failures are normally a result of invalid rating configuration but may also be caused by resource availability limitations. Data field contains additional information related to rating failure. |
| No Data Left | Total data consumption limit as displayed in service bytes left field has been exhausted. |
| No Username | No recognized form of username / network access identifier was presented processing authentication request. |
| No Password | Occurs when incoming authentication request is using an unknown, unsupported or unlicensed method of authentication or is malformed in some way. Data field contains additional information clarifying password problem. |
| Bad Digest | Bad digest indicates one of the following conditions:<br><br>• Receipt of a request from an unknown client not configured within "Emerald Admin" / "RADIUS" / "Access Servers"<br>• Authenticator or signature failure due to shared secret mismatch between secret configured within access server and Emerald.<br><br>When this error occurs data field contains address of authenticating client as seen by RadiusNT/X. |
| Bad username | Username contains "bad characters" as configured in the authentication menu of RadiusNT/X administrator or does not fall within acceptable size range. |

## Audit Logs

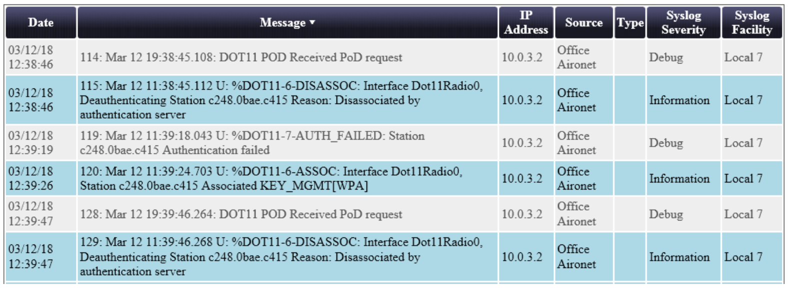



Starting with Emerald version 6 role of audit log has been reduced in order to limit overlap with more complete and detailed change history reporting. Audit log is now focused on system related events such as operator login failures, failed file and object access attempts and significant account related events such as recording a new payment. Audit log generally does not cover operator or user changes to accounts.

## System Logs




All system log data recorded by the Emerald syslog server is searchable within this report. In addition to search filters number of results displayed is constrained by administrator configured search limits.

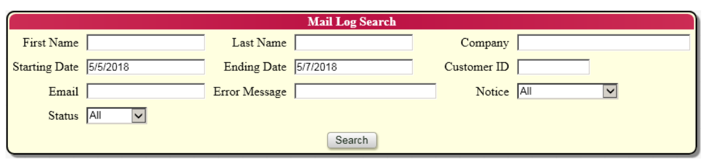


| Date | Message ▾ | IP Address | Source | Type | Syslog Severity | Syslog Facility |
|---|---|---|---|---|---|---|
| 03/12/18 12:38:46 | 114: Mar 12 19:38:45.108: DOT11 POD Received PoD request | 10.0.3.2 | Office Aironet | | Debug | Local 7 |
| 03/12/18 12:38:46 | 115: Mar 12 11:38:45.112 U: %DOT11-6-DISASSOC: Interface Dot11Radio0, Deauthenticating Station c248.0bae.c415 Reason: Disassociated by authentication server | 10.0.3.2 | Office Aironet | | Information | Local 7 |
| 03/12/18 12:39:19 | 119: Mar 12 11:39:18.043 U: %DOT11-7-AUTH_FAILED: Station c248.0bae.c415 Authentication failed | 10.0.3.2 | Office Aironet | | Debug | Local 7 |
| 03/12/18 12:39:26 | 120: Mar 12 11:39:24.703 U: %DOT11-6-ASSOC: Interface Dot11Radio0, Station c248.0bae.c415 Associated KEY_MGMT[WPA] | 10.0.3.2 | Office Aironet | | Information | Local 7 |
| 03/12/18 12:39:47 | 128: Mar 12 19:39:46.264: DOT11 POD Received PoD request | 10.0.3.2 | Office Aironet | | Debug | Local 7 |
| 03/12/18 12:39:47 | 129: Mar 12 11:39:46.268 U: %DOT11-6-DISASSOC: Interface Dot11Radio0, Deauthenticating Station c248.0bae.c415 Reason: Disassociated by authentication server | 10.0.3.2 | Office Aironet | | Information | Local 7 |

| Field | Description |
|---|---|
| Message | Filters search results by substring match to message text |
| IP Address | Filter search results by IP address having generated log message |
| Starting Date | Date from which to begin search for messages received after starting date |
| Ending Date | Date before which to search for messages received prior to ending date |
| Type | Filter by a content based classifier applied during initial receipt of message. Syslog Message Types are configured from "Emerald Admin" / "Reports & Logs" menu. |
| Severity | Filter by severity level. Only messages exactly matching chosen severity level are included. This filter does not automatically include higher severity messages. |
| Facility | Syslog facility refers to the internal source of the message. In non-UNIX environments one of the numbered local facilities are generally used to specify message source. |
| Source | Filter by address based classifier applied during initial receipt of message. Syslog Sources are configured from "Emerald Admin" / "Reports & Logs" menu. |

## Mail Logs

Searchable listing of outgoing emails successfully or unsuccessfully transmitted from Emerald notification system. Listing includes all notices, bulk messages, invoices and statements.

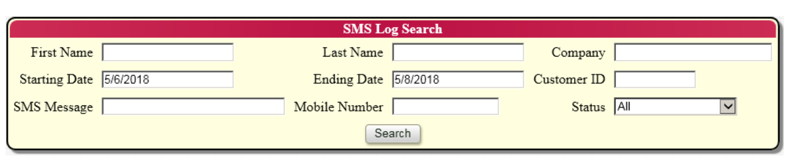



Should failure occur transmitting Emails Status column of search result contains response message from the SMTP server. In some situations Emails may be accepted and queued for delivery yet ultimately fails to reach their destination during subsequent processing to forward message to final destination. Nonetheless such messages appear as "Sent" within search results. In this case it is normal for a misdelivery report to be generated and transmitted to sender (From address) of the message to provide notification of misdelivery.

Mail log data is also available from History within reports menu of an MBR when the Logs filter is checked.

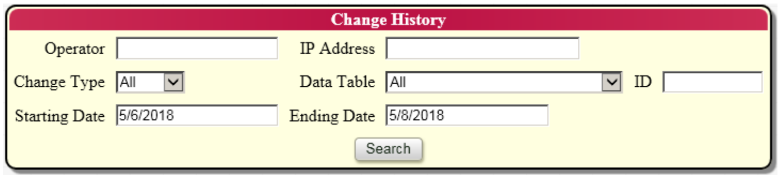
## SMS Logs

Often used for troubleshooting problems related to SMS delivery this report offers searchable list of all outgoing SMS messages. Search data includes full text

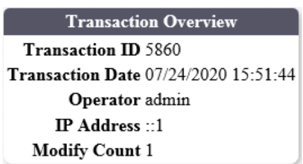


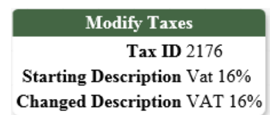
of message, destination number and status information detailing whether message was sent, has failed or delivery still pending.  Delay field in search data indicates elapsed time in seconds between initial entry into queue and processing by SMS poller.

## Change History




With few exceptions when operators, administrators or customers make changes to accounts and configuration from within Emerald or programmatically using Emerald API a history of changes is recorded and made searchable from this report.  Changes made as a result of direct manipulation of database outside of Emerald are not recorded. The process of recording changes always occurs transactionally with underlying changes ensuring change history data is always complete and accurate.  Change history can be used to review modifications made by operators over time or to better understand sequence of edits to a specific account.




In order to view change history operators must be a member of an operator group with global MBR access and read access to "Reports - Change History" object group.  Fields containing sensitive information including secrets, passwords, customer card and banking account numbers are not logged to change history.  Administrators may enable or disable change logging on a per-table or per field basis via "Emerald Admin" / "Reports & Logs" / "Change Logging".

| Field | Description |
|---|---|
| Operator | Filter by operator responsible for change |
| IP Address | Filter by client IP address used by operator while change occurred |
| Change Type | Filter by whether change was to add, modify or remove data |
| Data Table | Filter by an object corresponding to "what" was changed.  Each object in the selection list corresponds to a data table within Emerald schema. |
| ID | When a data table is selected ID corresponds to unique identifier of a row within data table to filter by.  For example if data table is "Master Accounts" then ID references MBR # (Customer ID).  If data table is "Sub Accounts" then ID references Service # (Account ID). |
| Starting Date | Filter by changes occurring on or after starting date |
| Ending Date | Filter by changes occurring on or prior to ending date |

Once a transaction has been selected from search results a series of display items are shown for each change to a data table occurring within the transaction.

| Item | Description |
|---|---|
| Transaction Overview | Summary of transaction including date and time of occurrence, operator making change, IP address of operator at the time of change and information about number of add, modify and delete operations included within the transaction. |
| Add (Object Name) | A new row is added with list of initial values provided to Emerald.  Any fields not present may have default values applied automatically based on Emerald schema. |
| Modify (Object Name) | When a row is modified a list of changed fields is recorded including data on starting value and changed value. |
| Delete (Object Name) | When a row is deleted permanently only the unique id is recorded. |

## Custom Reports

Client reports configured within "Report Groups" menu of "Reports & Logs" are available from this menu. While reports described in this section are bundled with Emerald additional reports created by administrators may also be accessible from this menu. To learn more about any reports not listed in this section please contact the system administrator.

Depending on licensed feature set and access privileges not all reports described below may be available to all operators.

### General

General offers system status, incidents and appointments, document storage and churn.

| Report | Description |
|---|---|
| Daily error summary | Globally sourced list of errors reported throughout Emerald suite. The report also checks for common problems offering warnings about conditions that may need the attention of an operator to resolve.<br><br>It is recommended error summary report be reviewed regularly. |
| Overdue Incidents | List of currently open incidents past configured due date or open longer than incident type overdue days. |
| Status by service type | Summary report on a per billing group basis providing counts of recurring services by service type and account status with separate columns for each status category including: active, expired, canceled and inactive. |
| File summary | Outputs total storage size and number of files stored by file category and file format. |
| Appointments Global | Detail report listing pending appointments by day and resource type including timeslot, appointment type, details, contact, distance and assignment for all appointments regardless of assignment. |
| Appointments Operator | While offering similar information to "appointments global" only appointments assigned to the operator are displayed. Similar information is also available from "assigned open appointments" dashboard widget. |

#### CHURN

Churn offers a month to month view of gained and lost accounts and pricing changes over time to helping to identify trends.

Churn reporting is based exclusively on account invoicing history. Account status and timelines including inactivation or deletion of MBRs and services have no direct influence on churn reporting beyond their effects on invoicing. Churn reporting is only applicable to recurring MBRs and services. Nonrecurring accounts as well as any one-time charges or postpaid usage billing are not reflected in any data included with any of the churn reports.

All churn figures including MBR and Service counts, invoiced and paid amounts represent an approximation of change over time by assuming invoicing history as of the first of each reporting month is representative of the full reporting month. For example an account subsequently upgraded, downgraded or closed during the reporting month is represented as maintaining its original state during month change occurred while change itself is reflected in the following month.

Accounts with discontinuous invoicing history such as customer who temporarily cancels service and returns months later will reflect loss after cancel and gain later when account is resumed and invoicing continues.

All invoice and payment figures are based upon invoiced price of service for the reporting month regardless of when in time the invoice was created or paid. All figures within churn reporting are intended to offer insights into trends over time and are not intended for financial reporting purposes.

| Report | Description |
|---|---|
| Churn | Global summary of all MBRs and services matching report criteria. ARPU based on MBR count. |
| Churn By Category | Summary of MBRs and services matching report criteria grouped by service category. ARPU based on service count. |
| Churn By GL Code | Summary of MBRs and services matching report criteria grouped by service type GL Code. ARPU based on service count. |
| Churn By Service Type | Summary of MBRs and services matching report criteria grouped by service type. ARPU based on service count. |
| Churn Detail | Detail listing of service changes matching report criteria organized by service type. |

## Accounting

Information related to invoicing and payment activity, sales commissions, forecasting, credit cards and taxation.

| Report | Description |
|---|---|
| Check deposits | Check payments posted by current operator within current day. In addition to payment detail summary information showing total number of checks and total payment amount is also displayed. Commonly used with deposit forms and checking payments against bank receipt. Operator name and date range are configurable. |
| Daily payments | List of payments grouped by day with subtotals by payment type within each day. Grand totals are also provided by payment type across all days of the reporting period.<br><br>For new payments the creation date of the payment is used as payment date. Report also includes modifications to payments at the time the modification is made. This is generally for example result of dishonoring a check payment or issuing a credit against an existing credit card payment.<br><br>If an effective date was set for a payment it has no effect on payment date as displayed in this report.<br><br>Daily payments report is fundamentally different from "GL Payments". As a result figures provided by each report are also different.<br><br>Daily payments offer information on new payments and changes to payments as they occur.<br><br>GL Payments report provides historical data from perspective of payment distribution |

<table>
<tr><td></td><td>to invoice line items.<br><br>For example a payment of $100 is made to an MBR with a $90 balance.<br><br>In this case the daily payments report records $100.  However "GL Payments" report records only $90 since there is not currently any outstanding invoice to distribute the remaining $10.  When MBR is invoiced again in the future at that time $10 will be recorded in the GL report as the remaining $10 is distributed to the future invoice.</td></tr>
<tr><td>Expiring credit cards</td><td>Lists recurring MBRs on credit card auto pay where credit card on file having expired or due to expire within 60 days or less.  Expired cards stop working once expire month and year have passed.</td></tr>
<tr><td>Failed transactions</td><td>Currently failed credit card transactions having not yet been replaced, retried or voided.  Information presented is similar to failed transactions display in "Billing" menu of Emerald client except masked card account number is not displayed.</td></tr>
<tr><td>GL deferred revenue</td><td>GL deferred revenue is a GL based summary of portions of recurring invoice line items into the future for which liability exists to provide service for accounts currently invoiced into the future as of a future reporting date.  For example a customer pays $120 yearly for service. If the report is run 11 months into service term deferred invoice amount displays $10 covering the remaining future month service having not yet been provided.<br><br>Deferred Paid represents the deferred invoiced amount currently paid.<br><br>Only recurring line items without taxes or one time charges are included.</td></tr>
<tr><td>GL invoiced</td><td>Provides summary general ledger data for input into accounting system by GL and service/charge/tax for those operating on accrual basis for transactions occurring during reporting period.<br><br>Before using this report it is recommended administrators check "Emerald Admin" / "Accounting" / "GL Codes" / "Uncategorized Items" to confirm all relevant items within Emerald have been assigned a GL code.<br><br>Information presented in this report is based on creation of new invoices during reporting period as well as any invoices having been voided during the reporting period.<br><br>
<table>
<tr><th>Column</th><th>Description</th></tr>
<tr><td>Description</td><td>Name of service type, charge type or tax being summarized</td></tr>
<tr><td>New Invoices</td><td>Reflects amounts from creation of new invoices during reporting period</td></tr>
<tr><td>Voided Invoices</td><td>Reflects amounts from invoices voided during reporting period</td></tr>
<tr><td>Adjusted Invoice Total</td><td>"New Invoices" minus "Voided Invoices"</td></tr>
</table>
<br>If a reporting period was in the past then invoicing data presented during this period remains stable.  A year later or 10 years later same report can be repeated for same past period and invoicing data used remains unchanged regardless of changes to accounts made within Emerald over that time.<br><br>Please note however configuration of GL code assignments to service types, charge types and taxes is always based on current configuration.  Even though underlying invoicing data does not change if GL code assignments are changed then GL category assignments of past items as displayed in the GL invoiced report is also changed to reflect current GL configuration.</td></tr>
</table>

| | |
|---|---|
| | This report does not display the same information as "Revenue by service type" report. As a result both reports provide mutually incompatible figures. "Revenue by service type" filters out credit line items, does not include tax line items, reseller invoices and ignores all voided invoices regardless of whether void occurred during or after reporting period. It is recommended "Revenue by service type" not be used for any kind of financial reporting purpose. See "revenue by service type" report below for more information. |
| GL payments | Provides summary general ledger data for input into accounting system by GL and service/charge/tax for those operating on cash basis for transactions occurring during reporting period.<br><br>Before using this report it is recommended administrator check "Emerald Admin" / "Accounting" / "GL Codes" / "Uncategorized Items" to confirm all items within Emerald have been assigned a GL code.<br><br>Information presented in this report is based on the distribution of payments to invoice line item as well as removals of payments from line items during the reporting period. Items having both been distributed to an invoice and subsequently removed from the same invoice during the reporting period are ignored by this report and do not cause both "New Payments" and "Voided Payments" to be incremented equally.<br><br>**Column** — **Description**<br>Description — Name of service type, charge type or tax being summarized<br>New Payments — Sum of payments distributed to invoices during reporting period.<br>Voided Payments — Sum of removal of payments from invoice during reporting period.<br>Adjusted Payment Total — "New Payments" minus "Voided Payments"<br><br>If a reporting period was in the past then payment distribution data presented during this period remains stable. A year later or 10 years later same report can be repeated for same past period and the same pay distribution data would be used in generating report regardless of changes to accounts made within Emerald over that time.<br><br>Please note however configuration of GL code assignments to service types, charge types and taxes is always based on current configuration. Even though underlying pay distribution data does not change if GL code assignments are changed then GL category assignments of past items as displayed in the GL invoiced report is also changed to reflect current GL configuration.<br><br>Some of the underlying pay distribution data used by this report is visible on a per-payment basis within MBR Payments menu under heading "Invoice Payment Distribution". While Emerald UI display is limited to currently valid pay distributions data on all past distributions is retained for historical reporting purposes.<br><br>This report does not display the same information as "Daily payments" report. As a result both reports provide mutually incompatible figures. Please see "Daily payments" above for details concerning relevant differences between reports. |
| Invoice discounting | Summary of discounts by service type and charge type across all non-voided invoices generated during the reporting period. Summary data is only provided for service types and charge types where at least one related discount is present over the |

| | |
|---|---|
| | reporting period.<br><br>**Column** / **Description**<br>Before Discount: Total pre-discount amount invoiced for this service type or charge type. Total includes all invoices within reporting period regardless of whether any discounts are present.<br>Total Invoiced: Total amount actually invoiced for this service type or charge type. Total includes all invoices within reporting period regardless of whether any discounts are present.<br>Total Discount Amount: "Before Discount" - "Total Invoiced"<br>Total Discount Percentage: "Total Discount Amount" as percentage of "Before Discount"<br>Amount: Total discount amount for this service type or charge type<br>Percentage: "Amount" as percentage of "Before Discount".<br><br>This report relies on data unavailable prior to Emerald version 6. Reporting for periods invoiced from earlier versions of Emerald results in no data for the earlier period displayed. |
| Monthly payment history | Series of charts offering historical summary of payment activity by month over time. By default monthly payment data over past 5 years is included.<br><br>This report is not intended for financial reporting. All charts except "Payment totals by GL Code" count payments as of the time of initial payment creation yet reflecting current payment amounts. For example a payment created in Jan for 100.00 then subsequently changed in March from 100.00 to 50.00 is displayed for purposes of this report as occurring in Jan with an amount of 50.00.<br><br>Due to fundamental differences between reports expect dissimilar figures from that of other payment related reports. "Monthly Payment Totals by GL Code" chart as well as "GL Payments" and "Daily Payments" reports display different information and will normally not match with any figures provided with this report. Specifically the GL Payments reports count payment application to invoice at time payment is distributed to invoice line items whereas this report reflects payment at point of payment creation regardless of when or whether some or all of a payment has been distributed to line items. This report differs with daily payments in that daily payment shows changes to payments at the time they occur where this report always reflects current amount of payment within the month of initial payment creation.<br><br>**Chart** / **Description**<br>Total Monthly Payments: Simple chart displaying total amount of payments by month across all payment types over the reporting period.<br>Total Monthly Payments by Payment Type: Similar to total monthly payments except totals for each payment type are charted separately.<br>Average Monthly Payment Amount by Payment Type: Reflects average amount of a single payment occurring across all payments within a given month and payment type.<br>Count of Monthly: Total count of payments recorded within the month by |

<table>
<tr><td></td><td><table>
<tr><td>Payments by Payment Type</td><td>payment type.</td></tr>
<tr><td>Monthly Refunded or Dishonored Payment Totals by Payment Type</td><td>Total of credits within a month by payment type where amount of a payment has decreased due to dishonoring a payment, issuing credit against existing payments or correcting data entry errors. The difference between initial amount and decreased amount is the credit amount shown.</td></tr>
<tr><td>Monthly Payment Totals by GL Code</td><td>Displays a monthly basis the sum total of payments distributed to line items by GL code.<br><br>This chart differs from all others above in that the point in time payment is distributed to a line item having a GL Code configured is used rather than creation time of payment.<br><br>This chart does not include contributions of payments having yet to be distributed to invoice line items, payments distributed outside of the reporting period of this report nor to line items without an assigned GL Code.</td></tr>
</table></td></tr>
<tr><td>Recurring revenue forecast</td><td>Based on the current billing dates and account information of services the recurring revenue forecast calculates recurring revenue that would be invoiced within reporting month should the current customer list remain constant. Revenue forecast does not take items such as the history of usage-based charges into account nor does it attempt to make corrections based on trends.<br><br>Revenue forecasting is only available for recurring MBRs. Nonrecurring MBRs are excluded from this report.</td></tr>
<tr><td>Recurring revenue daily forecast</td><td>Similar to recurring revenue forecast above except expected invoiced data is presented on a per-day basis within the reporting month.</td></tr>
<tr><td>Revenue by service type</td><td>Amounts invoiced and paid (to date) summarized by service type for the current month or defined date range.</td></tr>
<tr><td>Sales commissions</td><td>Commission reporting enables sales staff to be awarded credit for sale of one time and recurring products and services. Report provides summary data by sales person and service type or charge type over reporting period.<br><br>Prior to using commission reporting commissions are first configured by an administrator from "Emerald Admin" / "Sales & Marketing" / "Commissions". Additionally sales persons are assigned to corresponding commission groups. More details are available from Emerald administrators guide.<br><br>Once the configuration is in place sales persons at service level are credited for recurring services and MBR level sales persons are used for one time charges unassigned to any service. Reporting is based on current sales person assignment and commission configuration. Changes to sales person assignment or commission settings are reflected immediately the next time sales commission reporting is run including past periods predating configuration change.<br><br>Emerald commission system is point based where points are allocated on a per-item or percentage of cost basis.<br><br><table>
<tr><th>Column</th><th>Description</th></tr>
<tr><td>Item</td><td>Name of service type or charge type being summarized.</td></tr>
<tr><td>Item Count</td><td>Count of unique invoice line items credited to sales person for</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td></td><td>this item. This field is not influenced by line item quantity multiplier.</td></tr>
<tr><td>Invoiced Amount</td><td>Sum of line items credited to sales person for this item.</td></tr>
<tr><td>Invoiced Point Total</td><td>Sum of points awarded for this service type or charge type per commission configuration from invoicing perspective.</td></tr>
<tr><td>Paid Amount</td><td>Sum of payments applied to invoice line items credited to sales person for this item.</td></tr>
<tr><td>Paid Point Total</td><td>Sum of points awarded for this service type or charge type per commission configuration from perspective of payment against invoice line items credited to sales person for this item.</td></tr>
</table>
</td></tr>
<tr><td>Sales commission detail</td><td>Commission detail report is identical to sales commission report above except data is provided on a per MBR basis.</td></tr>
<tr><td>Tax payments</td><td>
Commonly used for tax reporting. Given selected criteria new payments applied to or removed from invoice tax line items during reporting period are represented within this report.
Data provided by tax report is historical and unchanging for reporting periods in the past regardless of future changes within Emerald.
<table>
<tr><th>Column Group</th><th>Description</th></tr>
<tr><td>Tax Payments</td><td>Amounts paid against given tax over reporting period.</td></tr>
<tr><td>Taxable Amount</td><td>Taxable portion of invoice line items directly responsible for assessment of underlying tax. Taxable amount is proportional to percentage of tax paid at the invoice level during reporting period.</td></tr>
<tr><td>Invoiced Amount</td><td>Total invoice amount of any invoices contributing to this tax. This includes contributions from non-taxable line items within the invoice. Invoiced amount is proportional to percentage of tax paid at the invoice level during reporting period.</td></tr>
</table>
For each column group data for the following columns is provided.
<table>
<tr><th>Column</th><th>Description</th></tr>
<tr><td>New</td><td>Payments assigned to invoice tax line items during reporting period.</td></tr>
<tr><td>Voided</td><td>Payments removed from invoice tax line items during reporting period.</td></tr>
<tr><td>Adjusted</td><td>"New" minus "Voided"</td></tr>
</table>
</td></tr>
</table>

## Users

Account data related to new and expired accounts

| Report | Description |
|---|---|
| Daily new users | Listing of new services created within reporting period. New services are displayed regardless of whether MBR and or service are currently active. |
| Expired accounts | Active recurring MBRs and services having not been canceled and expired past grace displayed in order of latest service to expire.<br><br>This report is not applicable to non-recurring and balance forward accounts. |

| | |
|---|---|
| Future expired accounts | Similar to expired accounts report above except only services expiring past grace between time report is executed and a month into the future are displayed.<br><br>If MBR or services are also scheduled to close within next month then service is excluded from reporting. |
| Active MBR contacts | MBR contact list containing billing address, telephone, email, balance and service counts for each active MBR matching reporting criteria. |

## Systems & RADIUS

RADIUS authentication, accounting and gauge alerts.

| Report | Description |
|---|---|
| Service bandwidth usage | Charts total service consumption by all matching services by hour over reporting period using RADIUS interim accounting data. Data includes total number of concurrent sessions, download and upload bandwidth.<br><br>RADIUS interim accounting with an update interval of 30 minutes or less is required for this report. Concurrent sessions are the counts of unique sessions seen within the hour and may not necessarily correspond with number of services. |
| Expired accounts /w auth attempts | Similar to expired account reports above except nonrecurring services are included and at least one RADIUS authentication failure due to service expiration has occurred within the past 7 days.<br><br>By showing expired accounts still attempting to authenticate this report can be useful for proactively contacting customers about renewing service. |
| Monthly call summary | Daily aggregate session summary from RADIUS accounting data showing completed sessions, average and total session duration and overall download and upload data consumption.<br><br>All data is based on stop records received within a day covered by reporting period. It is important to note data reported for any given session may span multiple days portions of what is reported in terms of data consumption may have at least partially occurred on days other than where it has been recorded within this report.<br><br>More accurate and granular data consumption statistics is available from Access Server Usage report for access servers supporting interim accounting. |
| User call summary | Identical to monthly call summary except data is aggregated by user rather than the day RADIUS accounting stop data was received within reporting period.<br><br>Similar to monthly call summary this report also relies exclusively on stop records which may partially span a time frame outside of the reporting period or stop records may yet to be received spanning a time within reporting period at the time the report was executed. This report is generally reliable for monthly periods in the past where all session data has had time to be recorded however figures presented may differ slightly from results of rating system or time/data banking which are able to leverage interim accounting data and include algorithms to split session data across billing month boundaries where necessary to accurately record usage as it occurred. |
| RADIUS log search | Similar to RADIUS Logs search as a quick report with report data download options |
| Access server acct status | Charts statistics related to health of RADIUS accounting data received from access servers. Each data point charted on y-axis represents an aggregate of occurrences within |

<table>
<tr><td></td><td>an "interval" of time equal to 1/500th of the reporting period.
<table>
<tr><th>Chart</th><th>Description</th></tr>
<tr><td>New Sessions</td><td>Total number of unique sessions starting per interval over the reporting period.</td></tr>
<tr><td>NAS Queue Delay</td><td>Average access server queue delay in seconds as transmitted via Acct-Delay-Time attribute per interval over reporting period<br><br>This parameter is only a measure of reported delay between event occurrence and successful transmission to RadiusNT/X server. Delay encountered from the time of receipt of accounting data and upload of data to Emerald database is not shown in this output.</td></tr>
<tr><td>Missed Start Records</td><td>Estimated total number of missing RADIUS accounting records per interval over reporting period.<br><br>Data may be missing due any number of conditions including but not limited to access server reboot, access server resource limit, network packet loss /w insufficient access server retransmission policy and RadiusNT/X server or database availability. This chart should normally always report 0. Should a value greater than zero be reported it is recommended cause be investigated to ensure reliable reception of accounting data in the future.<br><br>Estimates are based on receipt of interim or stop records for sessions having no prior known start record. It is possible for actual count of missing records to be higher than reported as missing interim or stop records may not be seen by this report.</td></tr>
</table></td></tr>
<tr><td>Access server usage</td><td>Charts an access server's utilization by hour over reporting period via RADIUS interim accounting data. Data includes total number of concurrent sessions, download and upload bandwidth utilization.<br><br>RADIUS interim accounting with an update interval of 30 minutes or less is required for this report.</td></tr>
<tr><td>Gauge detail</td><td>Chart of service level gauge data of each service matching selected criteria. Parameters Gauge and date range are required.</td></tr>
<tr><td>Service alerts</td><td>Lists currently active gauge threshold alerts for services. Alerts are based on data recorded by Emerald service monitor or externally provided gauge data.</td></tr>
</table>

## Inventory

Inventory management related reporting.

<table>
<tr><th>Report</th><th>Description</th></tr>
<tr><td>Reorder inventory</td><td>Provides summary of current available stock by product at each location vs configured targets for availability to assist operators in reordering more.
<table>
<tr><th>Column</th><th>Description</th></tr>
</table></td></tr>
</table>

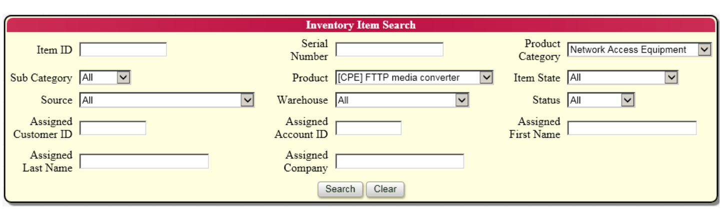
<table>
<tr><td></td><td><table>
<tr><td>Warehouse / Location</td><td>Product stocking location within product reorder settings</td></tr>
<tr><td>Product</td><td>Same product may appear multiple times in reorder reporting if more than one product stocking locations have been configured for a product.</td></tr>
<tr><td>Reserve</td><td>Count of items currently in a reserved state</td></tr>
<tr><td>Available</td><td>Count of items currently available</td></tr>
<tr><td>Target</td><td>Configured normal quantity of available inventory of this product that should be in stock at this location.</td></tr>
<tr><td>Suggest</td><td>Suggested quantity to purchase. (Target minus Available)</td></tr>
</table></td></tr>
<tr><td>Inventory assigned to closed services</td><td>Inventory currently assigned to inactivated, deleted or canceled accounts where a future reopening date is unavailable.<br><br>Inventory service assignments for inactivated and canceled services may be modified from service level inventory menu under the MBR. If an MBR or service has been deleted then recovered inventory can be unassigned using Search inventory under Inventory main menu item.</td></tr>
<tr><td>Unfulfilled service requirements</td><td>When product requirements have been configured at service type level and an active service has not been assigned an item from inventory matching product requirement the account and required product information is displayed in this report.</td></tr>
<tr><td>Product stock summary</td><td>Product centric view of current availability by warehouse and item status. For each product a historical chart of stock availability over time is included.</td></tr>
<tr><td>Warehouse stock detail</td><td>Detailed listing of each available inventory item currently assigned to the chosen warehouse. Data is also summarized by product and status.</td></tr>
<tr><td>Warehouse stock summary</td><td>Summary listing of available inventory currently assigned to the chosen warehouse by product and location.</td></tr>
</table>

## INVENTORY

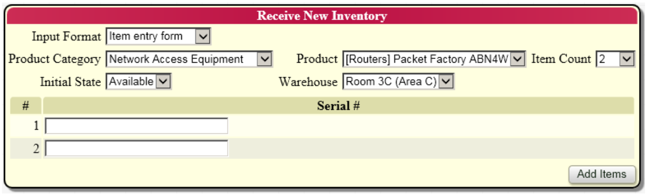
Receive new physical and virtual items to inventory, search and manage existing inventory.


### Search inventory

Status of items within inventory, item attributes and warehouse assignments are customized from inventory search. For items currently assigned to a service status changes are restricted to service level inventory menu.



## Receive Items



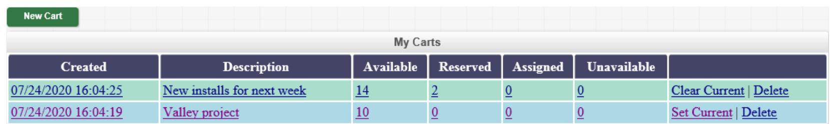

Record newly received items into inventory. Item data can be received using bulk input form, serial number / barcode scan list and external data file upload in a variety of formats.

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td>Input Format</td><td>Data import method when recording new inventory items.<br><br>
<table>
<tr><th>Format</th><th>Description</th></tr>
<tr><td>Item entry form</td><td>Bulk input form allowing selected item count of selected product to be recorded into inventory. A serial number field and any product specific item attribute fields may be presented for data input. Required status and format of serial number and other item level attributes depends on product level administrative configuration.<br><br>For items in the input form where serial number is not empty serial numbers are checked against existing data to ensure uniqueness. If serial number for preexisting item exists then an error display listing duplicates results and no items are recorded. When using this form duplicate serial numbers are allowed by listing the same serial in multiple rows of bulk input form so long as the serial number was not yet been recorded earlier. Duplicates are not automatically eliminated when using bulk import form.</td></tr>
<tr><td>Serial number list</td><td>Presents a large single text input box for bulk entry of serial numbers of selected product one item per line. This interface is intended for cut and paste of data from other applications or direct input from barcode scanners.<br><br>Empty lines and duplicate entries occurring anywhere within text input box are automatically eliminated from import. For example accidentally scanning same serial number twice does not require manual action to correct.<br><br>Before data is imported all serial numbers are checked against existing inventory for uniqueness. If a duplicate serial number is found for selected product no items are recorded to inventory and an error is displayed listing duplicates.<br><br>If serial number format is administratively configured at product level and one or more items do not correspond to the format then an error occurs and no items are recorded to inventory.<br><br>No additional item level attributes may be configured when recording new inventory using serial number list feature. Item entry form above can be used instead to record item level data in bulk.</td></tr>
<tr><td>File upload</td><td>Comma delimited (CSV) file containing list of new items to record</td></tr>
</table>
</td></tr>
</table>

| | |
|---|---|
| | to inventory. When a format including SKU, EAN or Product Title is used the item is recorded with this product overriding the current selected product.<br><br>Any rows of input file are not properly formatted to correspond with selected file format the row is ignored and not processed. If one or more validation failures occur an error message explaining failure(s) is displayed and no data is recorded. |
| Product Category | Restricts lists of products to members of selected product category. A product category and product must first be selected before items can be received into inventory. |
| Product | Default product associated with items recorded to inventory. When using file upload formats that select a product the default product is ignored. |
| Item Count | When input format is "Item entry form" represents exact number of items to be added to inventory. Count can be adjusted at any time while entering item data into the input form. |
| Initial State | Item status at time of initial creation. Status can be changed later at any time from search inventory form. |
| Warehouse | Initial warehouse and product location of all items recorded to inventory. |
| Item Serial #'s | Required when input format is "Serial number list". |
| File Format | When input format is "File upload" represents field layout of item list CSV file to be recorded to inventory. All fields are mandatory except formats ending with "Cost" which may be blank to indicate custom item cost is not provided. In the event cost field is blank a place holder for Cost field is still required (Line must end with comma). All file formats except "CSV /w Column Header" must not include a column header on the first line of the import file.<br><br>The file format "**CSV /w Column Header**" can be in either CSV or TSV form and requires column header be present on the first line of the file. Column label SerialNumber is required. Additional optional labels include 'Cost', 'SupplierCost', 'TrackNumber', 'Comments', 'ExternalRef', 'Product', 'State', 'Warehouse' and the labels of any item level attributes assigned to the product. No other column labels are permitted to be included with file. If an inventory item already exists its value is updated with the exception of the fields 'Product', 'State' and 'Warehouse' whose values remain unchanged when updating existing inventory. If an inventory item does not exist it is created.<br><br>Example:<br><br>**SerialNumber,Cost,SupplierCost,MAC,Color**<br>**CZD3344AB0001,173.30,120.50,"AABBCCDDEE00",Green**<br>**CZD3344AB0002,180.30,120.50,AABBCCDDEE01,Blue**<br><br>The file format "**Serial #,Attribute,Attribute Value**" uses serial number as a key to set attribute values for the inventory item corresponding with serial number. Accepted attributes include 'Cost', 'SupplierCost', 'TrackNumber', 'Comments' and 'ExternalRef'. Additionally the label of any item level attribute assigned to the product may be referenced by name. For example if an item level attribute is named 'MAC' then 'MAC' is entered in the Attribute field to set MAC value. To set or change multiple attributes for a given serial number the serial number is repeated on additional lines one row per attribute. If an inventory item already exists its value is updated. If an inventory item does not exist it is created. Example:<br><br>**CZD3344AB0001,Cost,173.30**<br>**CZD3344AB0001,SupplierCost,120.50**<br>**CZD3344AB0001,MAC,AABBCCDDEE00**<br>**CZD3344AB0001,Color,Green**<br>**CZD3344AB0002,Cost,180.30** |

| | |
|---|---|
| | **CZD3344AB0002,SupplierCost,120.50**<br>**CZD3344AB0002,MAC,AABBCCDDEE01**<br>**CZD3344AB0002,Color,Blue**<br><br>If any failures occur using this format upload is aborted and no changes are saved. |
| File Upload | When input format is "File upload" CSV formatted item list is uploaded from client browser. File size must not exceed 20 MB. |

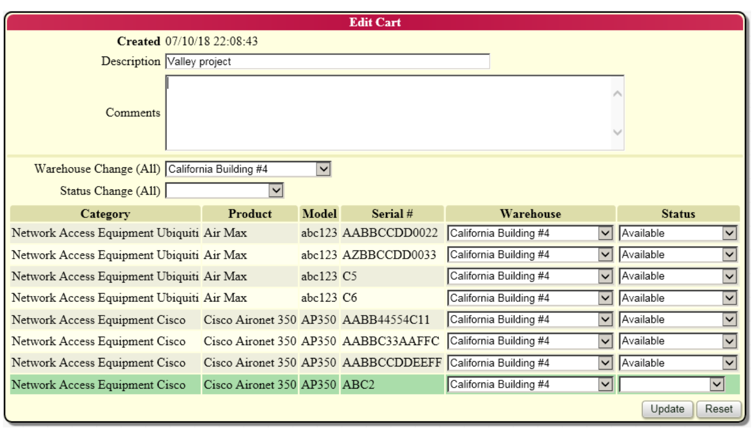
## My Carts




Carts provide a means of efficiently managing any number of items from inventory together as a unit or separately as needed. Carts allow operators to quickly move inventory between warehouses or change status of multiple items at once.

Once a cart has been created or "set current" a new column appears with search inventory search results enabling new items to be placed into the "current" cart. The current cart can be changed by clicking "set current". Clicking clear current results in no carts being "current" and as a result the options in the inventory search to add items to cart are unavailable so long as no cart is current.

In addition to bulk management any available cart can be selected as search criteria within all inventory search menus to optimize selling or assigning items from inventory to customers.

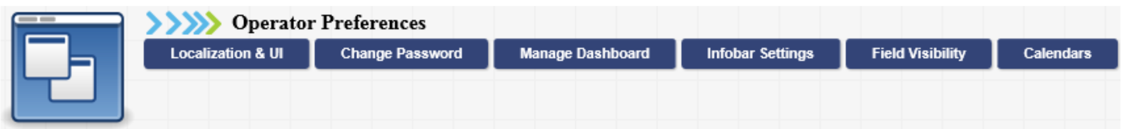



| Field | Description |
|---|---|
| Description | Optional label describing cart. This is displayed in "My Cart" listing as well as cart selection within inventory searches. |
| Comments | Additional notes about this cart |
| Warehouse Change | Mass change all items currently assigned to this cart to selected warehouse. Mass change can be undone prior to updating the form by clicking "Reset". Exceptions to mass change can be applied on a per item basis following the change. |
| Status Change | Mass change all eligible items currently assigned to this cart to have selected status. Items already assigned or sold to customers cannot be changed from within a cart. An item may have a different status group assigned to it and statuses specific to the item may differ from status change selection. |
| Warehouse | Selects warehouse location currently associated with this item |

| | |
|---|---|
| Status | Selecting remove from cart removes the item from cart once the cart is updated. When removing a large number of items from inventory it is recommended search inventory be used selecting the cart as search criteria. This interface is optimized for bulk removal with a single click. |

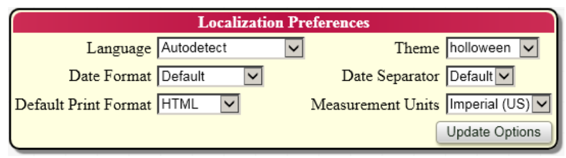
# OPTIONS

Operator preferences to personalize Emerald client interface are managed from this menu.




## Localization & UI

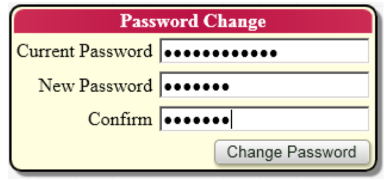
Manage Emerald client language, date formatting, units of measure, reports rendering and client appearance.




| Field | Description |
|---|---|
| Language | Sets the language of the Emerald client interface. Default and recommended value is "Auto detect" which uses your browser’s language preferences to determine correct language to display.<br><br>Emerald Administrator interface is only available in English regardless of configuration. |
| Theme | Choosing a theme sets interface look and feel displayed within operator interface.<br><br>In some cases theme selected from this menu may not be used should alternate scoring criteria take precedence. Technical information about themes and scoring are available from Emerald Administrator's guide. |
| Date Format | Sets format to display date fields throughout Emerald. Global date format is used when default is selected. |
| Date Separator | Sets the date separator character when displaying date fields throughout Emerald. The global date separator is used when default is selected. |
| Default Print Format | Reflects requested print format when printing reports or invoices and statements. Actual print format used depends on the report render in use and which formats it’s capable of rendering. If the chosen print format is not available a similar format will automatically be substituted. |
| Measurement Units | System of measurement for display and management of length, distance and weight data throughout Emerald. |

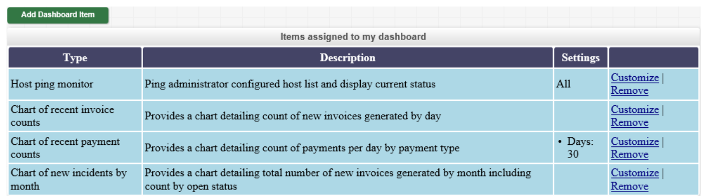
## Change Password

To change your operator password enter current password, new password into new password field and finally repeat entry of new password into confirm field. Once Change Password button is pressed and existing password is verified as correct, new and confirm values match and are acceptably formatted your operator password is successfully updated. Change is effective upon next login and does not affect continuation of current login session.




## Manage Dashboard

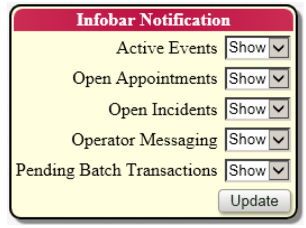
Operator dashboard is displayed via "Home" main menu shown automatically upon operator logon. Each operator is able to customize the dashboard displaying pertinent data specific to individual needs from this menu. Once an item is added to dashboard follow customize menu option to change settings specific to each item.




| Dashboard Item | Description |
|---|---|
| Active events | Listing of currently open events describing situations such as service outage and event applicability. This item can be customized to filter by event type. |
| Active MBR count | Displays summary of currently active recurring and non-recurring MBRs from MBR licensing perspective. Recurring accounts are included as long as the MBR remains active regardless of expiration status of services. Non-recurring accounts are included as long as MBR contains at least one active service not having expired or run out of time/data. |
| Active RADIUS sessions by NAS | Provides summary information for all currently active RADIUS sessions by NAS showing current session count and approximate total recent download and upload bandwidth. |
| Assigned open appointments | Provides listing of open appointments assigned to the operator |
| Assigned open incidents | Provides listing of open incidents assigned to the operator or one of the selected roles |
| Chart of new incidents by month | Provides a chart detailing total number of new invoices generated by month including count by open status |
| Chart of recent invoice amounts | Provides a chart detailing total amount of new invoices generated by day |
| Chart of recent invoice counts | Provides a chart detailing count of new invoices generated by day |
| Chart of recent payment amounts | Provides a chart detailing total amount of payments per day by payment type |
| Chart of recent payment counts | Provides a chart detailing count of payments per day by payment type |
| Host ping monitor | Ping administrator configured host list and display current status. Host lists are configured from "Emerald Admin" / "Web Interface" / "Web Links" where "Operator Pinger" is set "Yes" for the group. |
| Incident state summary by incident type | Summary by incident type showing total number of incidents per incident state. |
| Incident status summary by incident type | Summary by incident type showing total number of incidents in given category of states. |
| Recent RADIUS auth failures | Listing of recent RADIUS authentication failures. List does not include authentication failures due to unknown username or password mismatch. |

| | |
|---|---|
| Web links | Displays administrator configured web links managed from "Emerald Admin" / "Web Interface" menu. |

## Infobar Settings

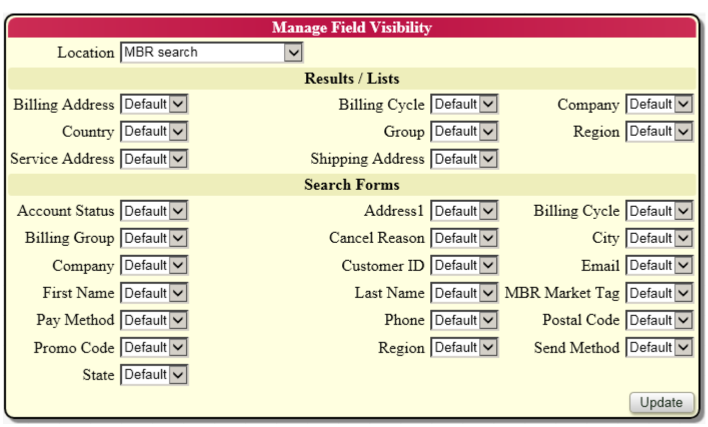



Alerts appearing in Information bar just above primary navigation menu of Emerald's operator interface are customized from this menu. Clicking a displayed alert generally links to detailed information related to the item. Information bar is not updated in real-time with display of current results delayed up to 90 seconds.

| Notification | Description | Links To |
|---|---|---|
| Active Events | Displays count of active events while one or more events remain active. | Support menu events filtered by active status. |
| Open Appointments | Displays count of open appointments assigned to operator when 1 or more appointments are open. | Support menu incident search for open appointments assigned to operator. |
| Open Incidents | Displays count of open incidents assigned to operator when 1 or more incidents are open. | Support menu incident search for open incidents assigned to operator. |
| Operator Messaging | Displays administrator configured message if present as configured from "Emerald Admin" / "Messaging" / "Operator Messaging". | N/A |
| Pending Batch Transactions | Displays count of existing CC and EFT transactions currently queued to be processed by a batch processor. | Billing menu transactions awaiting export. |

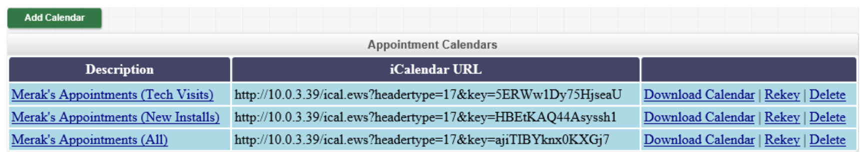
## Field Visibility

Field visibility enables fields throughout Emerald client interface to be selectively displayed or hidden from view based on operator preferences in order to best match needs of individual operators. In addition to operator preferences visibility is configurable administratively on a number of levels including Global, Billing Group, Service Type, Operator Group, Operator, Address Type and others. If a field has explicitly been administratively hidden then an operator preference of "Show" does not override visibility and field remains hidden.



| Visibility Setting | Description |
|---|---|
| Default | Indicates no preference for or against visibility of field. This is the default setting for all operator managed preferences.<br><br>When "Default" the corresponding field is visible only when at least one level of administrative configuration is "Show" and no administrative configuration is "Hide". |
| Show | Indicates a preference for the corresponding field to be displayed. If field has been administratively hidden then "Show" has no effect and field remains hidden. |
| Hide | Indicates corresponding field is to be unconditionally hidden from view. |

## Calendars

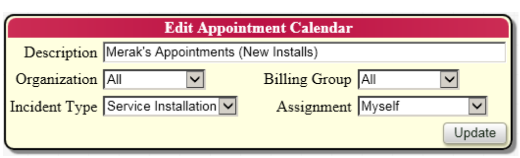



The "iCalendar" industry standard format for transmitting appointment calendars to external groupware, schedule management systems and services offer a means of always staying on top of new appointments assigned from Emerald. Existing appointments may be downloaded manually or calendar URL entered into software to provide persistent updates to external software as scheduling changes within Emerald.

Each calendar URL contains a unique randomly chosen authorization key to protect confidential customer and appointment information from disclosure and to uniquely identify each calendar. Care should be taken to keep calendar URLs confidential. If necessary a new authorization key can be assigned to an existing calendar by clicking "Rekey". Rekey changes URL of the calendar requiring any external software using the URL be updated with the new version.

Before calendar URLs can be used by external calendaring systems an administrator must enable remote calendaring within trusted access menu of Emerald Admin / Security. If trusted access is not enabled a warning is displayed and calendars may still be downloaded to a file and imported into calendaring software manually.

When using a calendar URL data is normally refreshed hourly. This may vary significantly by system or with external system configuration.




| Field | Description |
|---|---|
| Description | Optional name of calendar. Calendar name is displayed both within this menu and transmitted as name of calendar with iCalendar data.<br><br>In some systems naming a calendar can interfere with merging schedules from other sources into a single view. If you do not wish for name to be transmitted set description field to a blank space. |
| Organization | Filter appointments to MBRs of selected organization |
| Billing Group | Filter appointments to MBRs of selected billing group |
| Incident Type | Filter appointments by incident type |
| Assignment | Choose whether to show calendar of only appointments assigned specifically to you or all |

| | |
|---|---|
| | accessible appointments assigned to specific roles. |