



# TenantEye Guide

March 6, 2014

This documents the TenantEye tenant billing and sub-metering application on the Niagara AX platform.

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## Overview

TenantEye is a sub-metering and invoicing application. Property managers and tenants can access the entire application with a browser. It features an extensive palette of meters, and each suite can have a unique combination of meters. PDF invoices are automatically mailed, and there is a tenant HTML interface.

## Architecture

The root application object is the TenantBilling object. Under it belong Suite objects which represent physical space tenants occupy. Under each Suite belong meters and some of them may be linked to equipment.

- TenantBilling
  - Suites
    - Meters
  - Tenant Servlet

Workbench is needed to install these objects and perform any linking, but most other configuration can be done via the application in a web browser. Tenants can be reconfigured on a Suite by property managers without requiring a Systems integrator.

## Compatibility

### Niagara AX 3.0.nnn and 3.1.nnn

This application is no longer maintained for versions earlier than AX 3.2.

### Niagara AX 3.2+

Install the latest version of this application.

### Niagara Email

Tridium's email implementation (email.jar) has had several issues. The following module revisions are the minimum required in each major release of Niagara:

1. 3.2.19
2. 3.3.23
3. 3.4.3

## Installation

### ***Module Installation***

1. Install `csi3tenant.jar` on the computer where Niagara AX Workbench will be run. To install, place a copy of the file in the modules directory of your Niagara AX installation. This is typically `C:\Niagara\Niagara-3.n.nnn\modules`.
2. Restart Workbench.
3. Install the module on the target station. Using a Niagara AX Workbench where the module has already been installed, connect to the station's platform service. Go to the Software Manager and install.

### ***Email Service Installation***

The EmailService is required for automatic invoicing.

1. If the email service is not under `/services`, copy and paste one from the email palette.
2. If the email service does not have an outgoing account underneath, copy and paste one from the palette.
3. The most important properties for configuration are:
  - a. Hostname – either the IP address or domain name of the email server (ie `mail.example.com`).
  - b. Port – the default SMTP port is 25.
  - c. Account – An email account on the server authorized to send email.
  - d. Password – The password for that account.
  - e. Debug – If you are having problems, set this to true and watch the station console.
  - f. Use Authentication – It is best to set this to true even though some providers do not require an account password.
4. Right-click the `OutgoingAccount` object, choose Actions -> Send and send a test email.

### ***Add the TenantBilling Object***

1. Open the `csi3tenant` palette in Workbench.
2. Copy and paste a `TenantBilling` object anywhere in your station.
3. Name it well, avoid name changes at all costs.
4. Multiple `TenantBilling` objects can be installed in a station.
5. It is very important that the `TenantBilling` object and Suite objects not be renamed or moved after users are created. If the slotpath of these objects changes, `TenantBilling` users will not be able to logon to the application.

## ***Licensing the Tenant Billing Object***

Every suite must be licensed. Unlicensed suites will operate in demo mode for 2 hours. After demo mode expires, the station must be restarted to resume operation, but it is otherwise safe to build a database.

1. Go to the property sheet of the TenantBilling object. Expand or double click the “License” property.
2. Set the total number of suites that will be or have been purchased in the Suites property.
3. CTRL-C copy the “Product Code” property.
4. Paste the product code into an email and send to your distributor. The will respond with a license key.
5. CTRL-C copy the license key from your distributor. Paste it into the “License Key” property field.
6. Reboot the station.

## ***Adding Suites***

1. Name Suite objects for their physical location not the tenant. Tenant information is reconfigurable on each suite.
2. Copy and paste Suite objects from the csi3tenant palette directly under the TenantBilling object.
3. It is very important that the TenantBilling object and Suite objects not be renamed or moved after users are created or billing events logged to the database. If the slotpath of these objects changes, TenantBilling users will not be able to logon to the application.
4. Suites can be configured by going to the property manager’s homepage and following the setup link for each suite.

## ***Adding Meters***

1. Choosing the right kind of meter is the hardest thing to do with this application.
2. You must first understand how the owner intends to charge the tenant before adding a meter because there are many different meters.
3. Each suite can have a unique set of meters.
4. Name your meters well, avoid renaming your meters.
5. There are many meter configurations available. For example, a meter can be tenant overrideable and have a numeric input to measure consumption. Here are some general guidelines for choosing the appropriate meter:

### **Is a tenant override required?**

If yes, then you want a meter with “Scheduled” in its name. Scheduled means there is an override schedule and for a billable event to occur, an override event must be active.

### **Does the meter require its own Niagara NumericSchedule rate schedule?**

If yes, then you want a meter with “Rated” in its name. Rated meters have a built in NumericSchedule which is linked to the “Rate In” property that all meters have. Other meters can set this property to a fixed hourly rate, or be linked to the master rate schedule or custom logic.

**Does the meter require a boolean input?**

If yes, choose a meter with “Boolean” in its name. Boolean meters only record billable events when the input is true and they charge for time of use.

**Does the meter require a numeric input to measure consumption?**

If yes, choose a meter with “Numeric” in its name. The application does not care what is being metered. The units (such as kWh) are configurable.

6. The meterOut property of all meters will only be true when the tenant is in a billable event. This means the criteria of the various dimensions must be true. So if the meter is overrideable and has a boolean input, the input must be true and an override event must be active.
7. The meters for each suite can be configured by going to the property manager’s homepage and following the setup link for each suite.

## ***Adding the Tenant Servlet***

The servlet interface is a simple HTML interface that can be used by tenants to rapidly enact overrides.

1. The servlet interface is only accessible by tenant users created in suite setup.
2. The servlet interface only works for “Scheduled” meters.
3. Paste the TenantServlet object anywhere in the station. Under the TenantBilling object would be best. If there are multiple TenantBilling objects in a single station, only one instance of the TenantServlet is needed.
4. The default URL is http://<host>/tenant. The servlet name is configurable on the property sheet of the servlet object.

## ***User Permissions***

On the property sheet of the top level TenantBilling object are two permissions properties: Owner and Tenant Permissions. These permissions are assigned to new users created with TenantEye interface.

Those permissions can be changed. Owner level users require admin read, write and invoke permissions for the entire TenantEye tree of objects. Tenants require the operator read, write and invoke permissions for the TenantBilling object and their respective suite.

## **Configuration**

### ***Configuring Owner Information***

1. Double click the Tenant Billing object.
2. On the top toolbar, press the Owner Setup button.
3. Add property management and owner level users. These users can configure suites and create and modify invoices.
4. Complete the owner information. This information is used on the invoice and for emailing the invoice.
5. Provide an email address for the sending of error messages.

### ***Configuring Suite Information***

1. Double click the Tenant Billing object.
2. Click the setup link for each suite.
3. Setup navigation is on the bottom toolbar.
4. Follow the instructions on each setup page.
5. Begin occupancy on the last page of setup.

### ***Batch Editing Suites***

1. Double click the Tenant Billing object.
2. Press the “Suite Manager” button on the top toolbar.
3. Common properties across all suites can be edited at once in the popup.

### ***Master Rate Schedule***

If every suite can share a single Niagara Numeric Schedule as the master rate schedule, there is a master rate schedule so that all suites can be configured at once.

1. Go to the property sheet of the TenantBilling object.
2. Set the “Use Master Rate Schedule” property to true.
3. The “Master Rate Schedule” is on the same property sheet.
4. Link the “Out” property of the master rate schedule to the “Rate In” property of all the target meters.
5. The master rate schedule can then be accessed and configured from the property manager’s home page.

### ***Links to External Pages***

The pre-built user interface was designed as a stand alone application. However, TenantEye provides a way to link out of the application from both the property manager as well as tenant pages.

1. The external link is shown as a button on the top toolbar of both the property manager and tenant homepages.
2. Configure external links on the property sheet of both the TenantBilling object and Suite objects.

3. Has External Link – Set to true.
4. External Link Image – Give the button an icon.
5. External Link Ord – Where to send the user when they click the button.
6. External Link Text – Button text.



## Operation

### ***Changing Tenants***

1. From the homepage, follow the invoices link for the target Suite.
2. Setup navigation is on the bottom toolbar
3. Follow the instructions on each setup page.
4. Begin occupancy on the last page of setup. This will delete existing history and invoices for the prior tenant.

### ***Automatic Invoicing***

1. Automatic invoicing is configured in the last page of suite setup.
2. \$0.00 invoices are automatically created, but will not be emailed.
3. Invoices can be modified and manually created by clicking the Invoices link for each suite.

### ***Manual Invoicing***

1. From the homepage, follow the invoices link for the target Suite.
2. Click “New” to create a new invoice. It will not be automatically emailed.
3. The invoice date will be from the time the last invoice was created until the current one. If other dates are desired, skip the rest of this second and go to “Modifying Invoices”.
4. To email the invoice, select it and press the “Email” button.
5. To print the invoice, select it and press the “View” button. In the invoice view, press the “Export” button on the bottom of the screen.

### ***Modifying Invoices***

1. From the homepage, follow the invoices link for the target Suite.
2. Double click an invoice, or select an invoice and press the “Edit” button.
3. Properties
  - a. You can change the date range.
  - b. There is a general adjustment field.
  - c. If the invoice field you want to edit is not available such as owner or tenant information, you can always create a new invoice and change the date range.
4. After modifying an invoice you should press the “Recalculate” button to generate a new total.
5. Press the “Email” button to send it.

## Meter Guide

There are a variety of meters that measure and record billable events. Here are some guidelines for determining the best meter for any given scenario.

### **Rated Meters**

Every meter has a numeric “Rate In” property. Meters whose type name includes the word “Rated” have a built in numeric schedule linked to that input. This schedule is accessible and editable by property managers from within the application.

All other meters leave the rate input unlinked. The application allows property managers to configure a fixed rate for these meters which is nothing more than setting the fallback value (like invoking “set” on a writable point). However, this input could be linked to something else in more advanced configurations.

### **Scheduled Meters**

Meters whose type name includes the word “Scheduled” are tenant overrideable. This means that a user has to schedule an override for a billable event to occur. This is done through the tenant pages in the application.

### **Boolean Meters**

These meters have a boolean “meterIn” property. The meter records the amount of time the meter is true during a billable event.

### **Numeric Meters**

These meters have a numeric “meterIn” property. The meter records the difference between the start and end values of a billable event.

### **Meter Rollovers**

If a Numeric meter can rollover, configure the Min Value and Max Value properties while in Workbench. These values will be used when the meter value at the end of an event is less than the starting value. If a meter can run backwards such as in solar applications, leave these properties at zero.

## ***ScheduledMeter***

This meter measures the duration of tenant scheduled overrides only.

- Meter Input – None.
- Meter Output – True if a tenant override is active.
- Rate Input – Unlinked.

### ***RatedScheduledMeter***

This meter has a built in rate schedule and measures the duration of tenant scheduled overrides.

- Meter Input – None.
- Meter Output – True if a tenant override is active.
- Rate Input – Linked to built-in rate schedule.

### ***BooleanMeter***

This meter measures the duration that its boolean input is true.

- Meter Input – Boolean.
- Meter Output – True if there is a non-zero rate and the input is true.
- Rate Input – Unlinked.

### ***RatedBooleanMeter***

This meter has a built in rate schedule and measures the duration that its boolean input is true.

- Meter Input – Boolean.
- Meter Output – True if there is a non-zero rate and the input is true.
- Rate Input – Linked to built-in rate schedule.

### ***RatedScheduledBooleanMeter***

This meter has a built in rate schedule and measures the duration of tenant scheduled overrides while its boolean input is true.

- Meter Input – Boolean.
- Meter Output – True if the input is true and a tenant override is active.
- Rate Input – Linked to built-in rate schedule.

### ***ScheduledBooleanMeter***

This meter measures the duration of tenant scheduled overrides while its boolean input is true.

- Meter Input – Boolean.
- Meter Output – True if the input is true and a tenant override is active.
- Rate Input – Unlinked.

### ***NumericMeter***

This meter measures the difference of a numeric input.

- Meter Input – Numeric.
- Meter Output – True if there is a non-zero rate and a non-null numeric input.
- Rate Input – Unlinked.

- Min and Max Values – For rollovers, these properties can only be configured in Workbench. Leave at zero if the meter can run backwards.

### ***RatedNumericMeter***

This meter has a built in rate schedule and measures the difference of a numeric input.

- Meter Input – Numeric.
- Meter Output – True if there is a non-zero rate and a non-null numeric input.
- Rate Input – Linked to built-in rate schedule.
- Min and Max Values – For rollovers, these properties can only be configured in Workbench. Leave at zero if the meter can run backwards.

### ***RatedScheduledNumericMeter***

This meter has a built in rate schedule and measures the difference of a numeric input during tenant scheduled overrides.

- Meter Input – Numeric.
- Meter Output – True if there is a non-null numeric input and a tenant override is active.
- Rate Input – Linked to built-in rate schedule.
- Min and Max Values – For rollovers, these properties can only be configured in Workbench. Leave at zero if the meter can run backwards.

### ***ScheduledNumericMeter***

This meter measures the difference of a numeric input during tenant scheduled overrides.

- Meter Input – Numeric.
- Meter Output – True if there is a non-null numeric input and a tenant override is active.
- Rate Input – Unlinked.
- Min and Max Values – For rollovers, these properties can only be configured in Workbench. Leave at zero if the meter can run backwards.

## History

March 6, 2014: Module version 3.7.106

- Made timezone optional in the tenant servlet.

Oct 10, 2013: Module version 3.6.406

- Fixed PX painting issues.
- Added the report module dependency.
- User passwords must now be at least 8 chars.

Feb 1, 2013: Module version 3.6.47

- Added auto logout configuration on the tenant servlet.
- Fixed problem with invoice pagination.

Aug 2, 2012: Module version 3.6.45.1

- Added Auto Email Invoice option.
- Fixed bug where pending invoice consumption would incorrectly be 0.
- Added more columns/properties to the suite manager view.

June 1, 2012: Module version 3.6.45

- Owner permissions were not being assigned to new owner level users.
- Can now relink the built in schedules.

March 28, 2012: Module version 3.6.36.2

- Added email address to the tenant user manager.
- Override events are now scheduled with a start a stop time.
- Minor UI fixes.

January 30, 2012: Module version 3.6.36.1

- Email invoices can now be sent when there are only cc or bcc recipients.
- Fixed errors that could happen during an event if there was no next event.
- Tenant Servlet had bugs scheduling events at 12 am and pm.

October 7, 2011: Module version 3.6.36

- Fixed logging of overlapping events.
- Log times are much nicer.

May 26, 2011: Module version 3.5.34.1

- Fixed owner logo binding on all pages.

March 24, 2011: Module version 3.5.34

- Added Owner Permissions property to the Tenant Billing Object
- Scheduled meters now track events with zero cost.
- Replaced the smart phone interface with a richer HTML interface.
- Added common thread pool to efficiently support multiple TenantBilling objects in a single station.

March 25, 2010: Module version 3.5.11.2

- Fee 2 was being displayed on invoices where Fee 3 should have been.
- Added Send Override Notifications. When true, meter overrides will be emailed to the owner email address.
- Made history capacity editable on each meter.

March 3, 2010: Module version 3.5.11.1

- Licensing fixed to properly handle multiple instances of the Tenant Billing object.
- New installs will have a single history device object per TenantBilling object as opposed to each suite.
- Begin occupancy deletes existing histories, not just clears them.
- The last release broke some scheduled meters.

November 30, 2009: Module version 3.1.30.10 / 3.5.11

- If the input to a numeric meter dropped to zero and then returned to a much higher number because of communications or equipment problems, very high charges would show up in the bill.

September 8, 2009: Module version 3.1.30.9 / 3.4.51

- It was possible for what was supposed to be the last billable event of an invoice to instead be the first billable event of the next.

June 8, 2009: Module version 3.1.30.8 / 3.3.27.1

- When whole quantities was set to true, if the amount was less than .5%, the quantity would remain unchanged and it should have been rolled down.
- Meter charges that result in NaN because faulty inputs are now ignored.

March 6, 2009: Module version 3.1.30.7 / 3.3.27

- Fixed a bug where emails were not being sent.
- All new licensing. Prior installs will need to be relicensed.
- New invoice layout.

July 16, 2008: Module version 3.1.30.6 / 3.3.23.1

- If Whole Quantities was true and the consumption was less than a second over an hour, the quantity charged for would be rounded up to the next hour.

May 9, 2008: Module version 3.1.30.5 / 3.3.23

- If a meter rolls over and wasn't configured for a roll over, very large negative consumption won't be recorded.
- During automatic invoicing, if an invoice has a 0.00 total, it will not be emailed.
- Added Master Rate schedule
- Added RuntimeHours
- Hid actions that tenants should not have had access to
- Removed redundant contact info.

October 11, 2007: Module version 3.1.30.4 / 3.2.16.4

- Changed invoice, more room for more meters.
- Removed link to tenant pages from Owners pages.
- Add meters page for owner.
- Enhances the owner's ability to view and modify invoices.
- Suite pages home link no longer take user to pages outside of the application.

September 4, 2007: Module version 3.1.30.3 / 3.2.16.3

- Removed current invoice details from the non-manager tenant pages.
- Minimum invoice is now applied before tax.
- Fixed the consolidated meters table layout on the emailed invoice.

August 8, 2007: Module version 3.2.16.2

- Added smart phone interface.
- Multiple TenantBilling objects can now be installed in the same station.

June 19, 2007: Module version 3.2.16.1

- Added Min and Max Value properties to Numeric meters for rollovers.

June 4, 2007: Module version 3.2.16

- Rough draft