Sealog User's Guide

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Author: Webb Pinner

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Introduction

Sealog is an open-source, general-purpose event-logging platform build to support the event-logging need of research vessels and deployed vehicles.

Sealog is not intended to be a “one-size-fits-all” event logging solution but instead strives to provide a solution that has value “as-is” but is also a platform that can be easily extended to meet custom event-logging requirements.

Server Architecture

Sealog implements a pure client/server architecture. The server does not include any application or web-UI. All event data is submitted and retrieved through authenticated API calls. The client should not store any event data long-term and should only provide an interface to users to interact with the server data.

Although it is possible to retrieve events by cruise and lowering an event is unaware of what cruise or lowering it is associated with. All queries are based on the events timestamp and which cruise/lowering that timestamp corresponds to.

Events and Ancillary Data

An ‘event’ is any observation, whether scientific or operational in nature, that is worth recording and that may not already be directly captured in textual form by other data logging systems.

Examples of scientific events include in-situ biological and geological observations. Examples of operational events are things such as cruise/dive milestones (I.e. ‘on-station’, ‘vehicle-in-water’, ‘vehicle-on-bottom’, ‘start-of-survey’, etc). An example of an event relevant to both science and operations would be the collection of a sample, it’s sample id number and its placement on a sample tray.

Within Sealog an event is comprised of a timestamp, an author, the event’s high-level value, optionally event-specific key/value pairs, optional free-form text and optional comment.

The Sealog data model provides the ability to associated multiple ancillary data points with an event. These ancillary data points may be real-time ship/vehicle navigation, frame capture filenames, real-time sensor data, etc. Ancillary data points can be added at the time the event is created or at anytime after the event is created. Taking this decoupled approach adds some complexity to the architecture but also adds the flexibility to accommodate sensor failures or the need to associate datasets that are unavailable when the event is created.

Cruises and Lowerings

Sealog events are not internally organized events by cruise or by lowering. Events simply exists on their own and are given unique UUID at the time of creation. This allows multiple events to have the same timestamp. It also means that things like name, location, start/stop times for cruises and lowerings do not have to be defined prior to creating events.

Sealog treats cruises and lowerings as metadata records. These metadata records include a UUID, name, start time, stop time, and some optional additional data points. Events for a particular lowering are retrieved simply by querying the database for all events that were created between the start and stop times defined in the cruise/lowering metadata record. Likewise the list of lowerings that occurred during a cruises can be retrieved by querying the database for all lowerings with start/stop times within the start/stop time of a cruise metadata record.

Event Templates

The Sealog API supports pre-defined templates for events. These are referred to within Sealog as event templates. Event templates allow the operator to implements a standardize vocabulary and ensure the full list of event options are captured when the event is created.

Users

The Sealog API includes role-based user authentication/authorization (authN/authZ) model. User information included the user's role and optionally access privileges are stored within the Sealog database. This allows the operator to define who has access to Sealog and what actions that user can perform on the Sealog data.

The Sealog Client

The Sealog Client is a web-based user interface accessible from any device with a modern web-browser.

The User Interface

Login Screen

The first screen users see when they open Sealog is the login screen. The login form includes the standard username/password form elements, a login button, a link to create a new account and a link to retrieve a forgotten password.

Logins are required in order to associate an author with an event however a generic “Guest” account is available for user groups that do not wish to have individual accounts. The login screen includes a “Login as Guest” button streamline the process of logging in.

Passwords for accounts are optional. This is useful for using general accounts that are role-based (i.e. Guest, Science).

Main Screen

After logging into the system the user is taken to the main event logging screen. The main event-logging screen is where users submit new events and can view recently submitted events. The main screen includes:

- Navigation Bar
- Event templates (blue buttons),
- Free-form text field,
- Recent event history,
- Auto-Snapshot (ASNAP) service status and available disk space

Navigation Bar

The navigation bar at the top of the interface includes links and dropdown menus to the various parts of the client. The options available are determined by the role of the user.

Event Templates

The event templates are visualized on the interface as blue buttons. Event templates allow users to quickly submit commonly used events. Clicking these blue buttons can either immediately add an event or optionally open a dialog window for adding additional event-specific details.

Free-form text field

The free-form text field is for submitting in-situ events that can not be captured via the event templates.

Recent Events

The recent event cards display the most recent event with all the events ancillary data and a list of the last 20 events. These panels displays events submitted by all users and are updated automatically in real-time.

Clicking the text for an event in the event list will display all ancillary data for that event similar to what is displayed on the most-recent event card. Clicking the comment bubble icon will allow authorized user to add/edit a comment for the corresponding event.

The event list card includes a filter option that allows users to filter the events displayed in the card by event type. Filtering the events may take a few seconds to apply. The filter also supports partial matches.

The user can review older events within the event list by using the “Older Events” button. Likewise the user can move forward in time with the “Newer Events” and can quickly return to the real-time events with the “Newest Events” button.

The ASNAP events can be shown/hidden using the “ASNAP” toggle at the bottom of the card.

Auto-Snapshot (ASNAP) service status and available disk space

The Auto-Snapshot (ASNAP) service status is displayed at the bottom of the page. When ASNAP is “On” ASNAP events are automatically created at a pre-defined interval. These ASNAP events are hidden from the event history by default. Clicking the “ASNAP” toggle with display any recently created ASNAP events.

Submitting Events

There are two ways to submit events from the Sealog client: the event templates (blue buttons) and the free-form text field.

Using the Event Templates

To submit an event using a template simply click on the desired blue button. The event templates may be configured as simple one-click event submission or it may prompt the user for additional event-specific information.

Events submitted using event templates allow the user to define a custom timestamp for the event. It is important to remember that the date/time is UTC. It the template does not prompt the user for additional information, holding SHIFT when clicking the template will force a prompt to appear.

Using the Free-form Text Field

To submit a free form event simply type text into the text field and click the “Submit” button located to the right of the free-form text field. The free-form text field is for summiting events for which there is no event template.

Event Comments

Event comments provide a clear mechanism for user to add additional context to an event after it's been created. Examples of comment content include:

- An observation is incorrect
- Additional observations not included in the original event submission
- Preliminary notes on the importance of an event

Reviewing Events from a Cruise or Lowering

To review the events from a cruise/lowering, click the "Review Cruises/Lowerings" link from the top navigation bar. This will display the cruise/lowering selection page. If the Sealog client is configured for logging events from a deployed vehicle then this page will provide users with the ability to select a cruise and lowering. If the client is configured for logging only cruise events then only the select cruise option will be available.

Cruises are selectable by year. If applicable, lowerings are selectable by cruise.

As the cruise/lowering are selected the interface will display the metadata record for the corresponding cruise/lowering. Once the desired cruise/lowering is selected, the user will be presented with four options for reviewing the cruise/lowering.

- Replay → VLC-style controls and a slider for scanning through a lowering. All associated data for a given event is displayed including preview of image data.
- Review → Similar to Replay but with a focus on just the events and without the VLC-style controls, slider or display of associated data. Users can choose to display the associated data for and event by clicking the window icon next to the desired event.
- Map → Similar to Replay and Review but with a focus on the position where the event was created. This interface includes a map of the lowering trackline and a slider for quickly scanning through the lowering.
- Gallery → Displays only the image data collected for each event, organized by camera name.

Filtering Events

The Replay, Review and Map interfaces include a form for filtering the events shown. Events can be filtered by event value, author, time or free text. The search form is case insensitive and partial matching is supported. Use commas between event values to search for multiple event values (i.e. FISH, CORAL). Prefixing an event value with a "!" character will perform a logical NOT operation.

Exporting events

Sealog allows users to export all or a subset of events from the database. Events can be exported with or without their associated ancillary data and the data can be exported in either JSON or CSV format.

Events can be exported from the Replay, Review or Map modes using the event download dropdown. To export the events, click the Download icon in upper-right of the Filtered Events card and select the type of export. The export is for the current list of events shown in the Filtered Events card.

System Management

Depending on the active user's role there will be a "System Management" dropdown in the top navigation bar of the Sealog client UI. The contents of this dropdown will also depend on the users role.

Event Management

The Event Management section allows admins to view all events in the Sealog database. To navigate to this section go to the "System Management" dropdown menu item in the top navigation bar and select "Event Management". The Event Management section looks similar to the cruise/lowering review UI but is for all events stored in the Sealog database.

Filtering Events

The Event Filter form is used to filtered the events shown. Events can be filtered by event value, author, time or free text. The search form is case insensitive and partial matching is supported. Use commas between event values to search for multiple event values (i.e. FISH, CORAL). Prefixing an event value with a "!" character will perform a logical NOT operation.

Exporting events

Events can be exported with or without their associated ancillary data and the data can be exported in either JSON or CSV format.

Events can be exported using the event download dropdown. To export the events, click the Download icon in upper-right of the Filtered Events card and select the type of export. The export is for the current list of events shown in the Filtered Events card.

Event Templates (those blue buttons)

To add/edit an event template go to the "System Management" dropdown menu item in the navigation bar and select "Event Templates" This will display the "Event Templates" page. This option is only available to users with the role of "template manager" or "admin".

The Event Templates page has 4 parts:

- A list of system event templates (only available to admin users)
- A list of non-system event templates,
- A button to import event templates from file (only available to admin users)
- A button to add a new event template
- A form card used for creating/editing event templates

System vs Non-System Event Templates

There are 2 classes of event templates: system and non-system.

System event templates can only be created/edited/deleted by admin users. The reason for system templates is to allow the vessel/vehicle operator to define a set of templates that should NOT be modified by the visiting science party.

Non-system templates can be created by any user with the role of “template manager” or “admin”. These are the events that can/should be managed by the science party to support their specialized needs.

Adding/Editing Event Templates

When a user first arrives on the Event Templates page a blank create event template form is already displayed. This allows the user to immediately start building a new event template.

To edit an existing template click the blue pencil icon next to the template you wish to edit. To preview what the template will look like in the main event-logging section click the green test tube icon next to the template you wish to preview. To delete and existing template click the red trash can icon next to the template you wish to delete. The Sealog client will prompt the user to confirm the delete to prevent accidental deletion.

The form to create/edit a template is dynamically built for the template. The most basic event template includes:

- *Button Name* → the name that will appear on the blue button.
- *Event Value* → the string that will be submitted as the event’s value.
- Free text Required → whether or not the observer MUST add some free-form text before submitting the event.
- System Template → if the template should be a system or non-system template (Admin users only)
- Disabled → if the template should be disabled and not shown on the event-logging page (Admin users only)

Beyond the basic template definition it is possible to add additional event template options. To add an event template option click the blue “Add Option” button. There are five types of event template options:

- Text → allows entering free-form text.
- Static Text → adds a text field that is pre-populated and cannot be changed
- Dropdown → allows selecting one value from a pre-defined list.
- Checkboxes → allows selecting one or more from a pre-defined list.
- Radio Buttons → allows selecting one or more from a pre-defined list.

These additional optional are for customizing the event template so that users are aware of what additional information can/must be included when submitting a particular event. Each additional element includes a “Require” checkbox. If the Require checkbox is selected then any when an event is created using this template, Sealog will require that the user complete that section of the event options form before the event may be submitted.

In the case of Dropdown, Checkboxes and Radio Buttons a default value can be set. This default value must be one of the defined options.

Exporting Event Templates

It is possible to export event templates to file. There are three reasons to export event templates:

- Including the event templates as part of the cruise data package
- User wants to move/copy the event templates to another instance of Sealog
- User wants to use the same event templates on a future cruise aboard the same vessel.

To export event templates to file, click the download icon in the header of the event templates tables.

Importing Event Templates from file (Admin users only)

To import event templates from a file, click the blue “Import From File” button located below the Event Templates table. This will open a modal window that presents the user with the option to select a file for import. Use the “Select File” button to find the file on the local file system. After the file is selected the modal will display the number of event templates found in the file and a real-time status update displaying the number of event templates pending, imported, skipped (because they already exist) and errors (problem with the event template data in the file).

Cruises and Lowerings

The Cruise and Lowering sections allows admins and cruise managers to view/edit the Sealog cruise and lowering records. To navigate to this section go to the “System Management” dropdown menu item in the top navigation bar and select “Cruises” or Lowerings”.

General Layout

The Cruise and Lowering sections are organize in a similar manner. Each section has 3 main components:

- Table of cruises/lowerings
- Form to Add/Edit a cruise/lowering
- Button to Import cruises/lowerings from file (Admin users only).

Table of Cruises/Lowerings

The cruise/lowering table displays all cruises/lowerings available in Sealog. There is a search text field at the header of this card for filtering the list. The download icon next to the search text field can be used to export all the cruises in the table.

To edit an existing cruise/lowering click the blue pencil icon next to the cruise/lowering you wish to edit. To delete an existing cruise/lowering click the red trash can icon next to the cruise/lowering you wish to delete. The client will prompt the user to confirm the delete operation.

To hide a cruise/lowering from non-admin users click the orange eye icon next to the cruise/lowering you wish to hide. To un-hide a cruise/lowering from non-admin users click the grey slash-eye icon next to the cruise/lowering you wish to un-hide.

Adding/Editing Cruises/Lowerings

When a user first arrives at the Cruises/Lowerings page the create cruise/lowering form is displayed. This allows the user to immediately start creating a new cruise/lowering.

To edit an existing cruise/lowering click the blue pencil icon next to the cruise/lowering you wish to edit. This will populate the form with the contents of the selected cruise/lowering. Required fields are designated with a red asterisks.

When done completing or updating the form, click the blue “Create” or “Update” button to save the cruise/lowering.

Exporting Cruises/Lowerings

It is possible to export cruises/lowerings to file. There are two reasons to export cruises/lowerings:

- Including the cruise/lowerings as part of the cruise data package
- Wanting to move/copy the cruises/lowerings to another instance of Sealog

To export users to file, click the download icon in the header of the users tables.

Importing Cruises/Lowerings from file (Admin users only)

To import cruises/lowerings from a file, click the blue “Import From File” button located below the Cruises/Lowerings table. This will open a modal window that presents the user with the option to select a file for import. Use the “Select File” button to find the file on the local file system. After the file is selected the modal will display the number of cruises/lowerings found in the file and a real-time status update displaying the number of cruises/lowerings pending, imported, skipped (because they already exist) and errors (problem with the cruise/lowering data in the file).

Additional Lowering Functionality

For vehicle-focused installations where vehicle navigation is integrated as ancillary data for the events there is additional functionality on the Lowerings page. This additional functionality includes the ability to use the navigation data to refine lowering start/stop times, lowering milestones as well as capture additional metadata such as a geographic bounding box for the lowering and max depth. Click the orange “Milestones/Stats” button in the Update Lowering form to open the lowering’s Milestones and Stats page.

The Milestones and Stats page displays a map and a depth vs time graph of the lowering. Below this are the list of configured milestones and a max depth and bounding box calculator.

To set a milestone, click on the desired milestone (text will turn orange) and select the desired milestone time on the depth plot.

To set the max depth and bounding box stats, click the calculator icon next to the corresponding stat.

When done, click the “Update” button to save the changes.

Users

The Users section allows admins and cruise managers to view/edit Sealog user records. To navigate to this section go to the “System Management” dropdown menu item in the top navigation bar and select “Users”.

The Users section has 5 parts:

- A list of system users (Admin users only)
- A list of non-system users,
- A button to add users from file (Admin users only)
- A button to add a new user
- A form for creating/editing users

System vs Non-System Users

There are 2 classes of users: system and non-system.

System users can only be created/edited/deleted by users with the role of “admin”. The reason for system users is to allow the vessel operator to define a set of users that should not be modified by the visiting science party.

Non-system users can be created by any user with the role of “cruise manager” or “admin”. These are the users that can/should be managed by the science party to support their team.

System Users and Users tables

The user tables displays all users records in Sealog. The search text field in the header of each user table can filter the users displayed in the corresponding table. The download icon next to the search text field can be used to export all the users in that table.

To edit an existing user click the blue pencil icon next to the user you wish to edit. To delete an existing user click the red trash can icon next to the user you wish to delete. The Sealog client will prompt the user to confirm the delete to prevent accidental deletion.

Admin users will have an additional orange eye icon. This is for seeing the users authorization token (JWT).

Adding/Editing Users

When a user first arrives at the Users page the create new user form is already displayed. This allows the user to immediately start adding a new user.

To edit an existing cruise/lowering click the blue pencil icon next to the user you wish to edit. This will populate the form with the contents of the selected user. Required fields are designated with a red asterisks. When done completing or updating the form, click the blue “Create” or “Update” button to save the user.

Admin users can promote/demote a user to system-user. This option appears as a “System User” checkbox on the user create/update form.

Admin users can disable user accounts. User accounts can be disabled if the operator wants to temporary prevent the account from being used. This option appears as an “Account Disabled” checkbox on the user create/update form.

Exporting Users

It is possible to export users to file. There are three reasons to export users:

- Wanting to make a backup of the users table.
- Wanting to move/copy the users to another instance of Sealog
- Wanting to use the same users on a future cruise aboard the same vessel.

To export users to file, click the download icon in the header of the users tables.

Only users with the role of “admin” can export system users. Users with the role of “cruise manager” or “admin” can export non-system users.

Importing Users from file (Admin users only)

To import users from a file, use the blue “Import From File” button located below the Users table. This button is only available to “admin” users. Clicking the button will open a modal window that presents the user with the option to select a file for import. After selecting the file the modal will display the number of users found in the file and real-time status messages displaying the number of users pending, imported, skipped (because they already exist) and errors (problem with the user data in the file).

Toggle ASNAP

There is the option with in the “System Management” dropdown to force the ASNAP server on/off. Clicking this option will toggle the current ASNAP status.

External Services

Auto-Snapshot (ASNAP)

Auto-Snapshot (ASNAP) is used to automatically submit a pre-defined event at a set interval. This ensures a minimum frequency of events even during periods where there may not be anything “event-worthy” occurring.

Although the status of the ASNAP service can be toggled within the Sealog client interface, the services itself is completely independent of both the Sealog client and server. The service is a python script *sealog_asnap.py* located in the *./misc* subdirectory of the Sealog Server installation directory. The script is controlled via Supervisor.

Auto-Actions

Auto-Actions is an optional python script that listens for new events and performs a defined task when the specified triggering task is received. The script *sealog_auto_actions.py* is located in the *./misc* subdirectory of the Sealog Server installation directory. The script is controlled via Supervisor.

This script is most often used in conjunction with Sealog instances for vehicle operations to automatically set the lowering milestones such as “in water”, “on bottom”, “off bottom”, “on deck”.

Aux Data Inserters

Ancillary/Aux data (aux data) inserters are processes that listen for new events and when an event is received the process builds and submits and aux_data record to the Sealog API containing addition data to associate with the event record. This addition data may be position data, sensor data, image files etc.

The boilerplate script *sealog_aux_data_inserter.py* is located in the *./misc* subdirectory of the Sealog Server installation directory. The Aux Data inserters scripts are independent of the Sealog server process and are controlled via Supervisor.

InfluxDB Integration

A specialized version of the Aux Data inserter is the InfluxDB Aux Data inserter. This process listens for new Sealog events and submits aux_data records to the Sealog API built with data queried from an InfluxDB. This allows the event to have a non-realtime timestamp and still have accurate ancillary data associated with it.

The boilerplate script *sealog_aux_data_inserter_influx.py* is located in the *./misc* subdirectory of the Sealog Server installation directory. The Aux Data InfluxDB inserter script is independent of the Sealog server process and controlled via Supervisor.

Post-Cruise/Lowering Data Exports

The Sealog client and server do not natively export data from the Sealog database to file after each cruise/lowering. Data exports typically handled by the *sealog_vessel_data_export.py* and *sealog_vehicle_data_export.py* python scripts. These scripts are located within the ./misc subdirectory of the Sealog Server installation directory. The data export scripts are independent of the Sealog server process and are controlled via Supervisor.

In their default mode the data export scripts can export data for the current cruise, an individual cruise within the Sealog database, the current lowering, an individual lowering

within the Sealog database, all the lowerings for the current cruise and all the lowerings for any cruise within the Sealog database. How the scripts operate is controlled via command-line arguments.