

Title: GIS Redlining Comes Full Circle

Authors: Ellen Hirayama, Keith Croteau, A.J. Romanelli

Abstract: Enterprise wide redlining capabilities provide the Honolulu Board of Water Supply (HBWS) with a dynamic continuous stream of updates to their GIS system from multiple GIS end user environments. Field crews submit updates via. a mobile application (MANO), office users submit redlines via. the Board's ArcIMS system (HONU), and GIS editors collaborate with each other via. redline submission and email follow-up (ArcMap). Each redline is reviewed by a GIS editor before it is entered into the enterprise GIS database (SDE). The redlining system allows for updates to be processed into the enterprise system quickly, the edited data is then available for all users of the system to access. End users of the system are encouraged to continue to utilize the system when they are able to see their edits being integrated into the enterprise GIS in this timely manner.

The Honolulu Board of Water Supply has implemented an enterprise redlining system that allows for continuous updates and improvements to their GIS based on input from end users. The system utilizes SDE as the backend mechanism for data storage and multi-user access. A "redline" is a marked up and geo-referenced image that communicates a change (or changes) from the end user to the GIS editors. A key aspect of the system is that the end users do not directly interact with the enterprise GIS database. Instead, they are presented with a greatly simplified "paint style" application. Rather than needing to know the ins and outs of a GIS editing interface (such as ArcMap), the end users "draw" on an image that communicates the changes that need to be made to the GIS editors. For example, rather than directly editing a hydrant that is stored at the incorrect location, the end user might draw a circle around the hydrant with an arrow indicating the proper location, and enter some text that describes the change that needs to be made.

When redlines are submitted the user may attach one or more documents for use by the GIS editors. Attached documents may consist of digital photos, pdf's, Excel spreadsheets, or any other digital data that might be useful to the editor.

The redline is then stored in the enterprise system until it is picked up by one of the GIS editors. When the GIS editor is ready to perform the redline edits they load the redline into their ArcMap editing session using the redline manager. Since the redline image is georeferenced, the editor is automatically zoomed to the area that requires attention by the redline manager. The editor may make the edit to the enterprise geodatabase immediately if the redline communicates enough information to do so, or they may gather further input from the user who submitted the redline if the suggested edit is questionable. This two-phase approach to editing allows a large volume of edits to be

submitted from the field crews without requiring them to learn and understand the GIS editing process and procedures.

Several client applications “feed” redlines into the HBWS enterprise system. The first redline source are users of the HBWS mobile application (MANO). The MANO application is designed as a disconnected mobile GIS system. The redlining component functions alongside the regular MANO functionality. When a field user notices a correction that needs to be made they create a redline for the edit. The redline is saved to the field computer, and synchronized to the enterprise system when the field crew returns to the office. The second redline source is the HBWS enterprise GIS internet server (HONU). HONU users (field and office personnel) can submit a redline in addition to the other website functionality. When a HONU user discovers an inconsistency they start the redlining applet, markup the image such that it describes the corrections that need to be made, and submit the redline to the GIS editors. Redlines submitted from HONU are immediately available to the GIS editors. The third source of redlines are ArcMap users (typically the GIS editors). The redlining toolbar for ArcMap allows users to submit redlines into the system in addition to allowing access to the redline system. All redlines are handled in the same manner once they are in the system regardless of the source of the redline. Additionally, all redlines are created by the same redlining applet regardless of the source of the source application, only the method by which the redline is transmitted to the enterprise redline repository (SDE) varies. Users who are familiar with using the redlining applet in HONU don't need to learn a new interface when they use MANO since both applications use the same redlining interface.

Once a redline has entered the system it can be “picked up” by any of the GIS editors using the redline manager. The redline manager allows access to the submitted redlines. The GIS editor can use the redline manager to load the redline into their ArcMap session. Once loaded into the editing session, the redline is flagged with a status of in progress so that other GIS editors will know that the redline is actively being worked on. The editor then uses the appropriate ArcMap tools to edit the enterprise geodatabase to make the changes indicated by the redline. Once the editor completes the edit (or edits) indicated by the redline, they then flag the redline as completed using the redline manager. Since the changes have now been completed in the enterprise GIS system, those changes will be propagated to the other GIS data systems (such as HONU and MANO). The quick turn around time between when a redline edit is submitted, and when that change is applied to the enterprise GIS system (which makes it available to the GIS data consumers) completes a positive feedback loop for the GIS data consumers. The rapid turnaround of edits encourages the GIS data consumers to continue to submit redlines and continue to improve the quality of the enterprise GIS database.

Redlining provides a quick and easy way for non-GIS users to communicate changes and updates to the enterprise GIS database to the GIS editors. Having those changes integrated into the system and pushed back out to the users of the data provides a

continuous feedback mechanism and closes the loop between the users of the data and the maintainers of the data.

Acknowledgements: N/A

Appendixes: N/A

End Notes: N/A

References: N/A

Author Information:

Ellen Hirayama
Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843
(808) 748-5251
ehirayama@hbws.org

A.J. Romanelli
EMA, Inc.
1970 Oakcrest Ave.
Ste. 100
St. Paul, MN 55113-2624
(619)-599-6161
aromanelli@ema-inc.com

Keith Croteau
EMA, Inc.
1970 Oakcrest Ave.
Ste. 100
St. Paul, MN 55113-2624
(970) 204-6879
kcroteau@ema-inc.com