BellHawk® Systems Corporation
Real-Time Work-in-Process and Materials Tracking Systems
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How BellHawk Licenses Work

Introduction

Licensing software like BellHawk, which can have many different users within an industrial plant, is a trade-off between making sure that only licensed users can use the software and making the licensing simple to administer.

In BellHawk, we issue an encrypted license file which restricts who can use which capabilities of the software on which server computer. This BellHawk license file is installed as part of the initial BellHawk software installation and can then be upgraded by the on-site BellHawk systems administrator uploading the license-file into BellHawk.

Whenever any user or device logs in to BellHawk this license-file is read and is used to limit who can use which capabilities of the BellHawk software.

This is in contrast to:

- Use of a license key strings (a set of letters and numbers) which are typed into an application and which is only suitable for a desktop application that has a single user.

- Entry of sets of dozens of license key strings into a setup screen, one for each option and the number of users licensed, which have to be performed every time the system is upgraded. This is very painful, error prone, and extremely time consuming. This scheme is typically used by legacy ERP systems.

- Use of a Cloud-based login for each user or device, favored by Microsoft and other large organizations to exert control over its user base. This is problematic if the login server in the Cloud is unavailable, due to an Internet outage, which can bring production to a halt even though the software is being run on the client's own server.

Being used in a manufacturing or industrial environment, brings its own set of challenges, for a work-in-process and tracking system such as BellHawk, namely:

1. Users have different roles and need to see different data depending on their role.

2. Data collection devices, such as ruggedized mobile computers with integral barcode scanners, are expensive and need to be shared between multiple users using a single device login.

3. The system needs to have an open-architecture database so that users can create their own reports based on the contents of the database.

4. The system needs to easily exchange data with other systems used by the plant.

5. The tracking system needs to maintain a complete history of who did what and when with what materials and equipment in its database.

How the BellHawk License File Works

The BellHawk license file contains a very long ASCII string of hexadecimal characters and as a result may be sent by Email over an unencrypted link. This BH.LEX file contains the following information, in encrypted format:

1. The name of the computer on which it is licensed to run

2. The name of the company to which it is licensed

3. The name of the plant or production facility to which it is licensed

4. The city, state, and country in which the plant is located

5. The number of shared data collection devices licensed

6. The number of manager and staff member logins licensed

7. The number of view-only logins licensed

8. Codes for the base system and optional modules licensed

9. Expiration date for license.

This license-file is stored on the disk of the Windows Server on which BellHawk runs so that it can be accessed without needing a Cloud based login to some external server.

Whenever any person or device logs in, this file is read, decrypted, and included in the system state for the BellHawk website, which is also kept on disk, and is used by all users and devices currently logged in to BellHawk. This system state is then used to control access to the BellHawk software.

User and device login data is entered into the BellHawk database through a system administrator screen and stored in the BellHawk database, with the passwords stored in encrypted format.

Devices can be shared between multiple users. To differentiate between users of a shared device, we require the device user to scan a barcode on their badge that uniquely identifies the user.

Users are divided into four categories:

1. The systems administrator - whose only role is to setup device and user logins and system-wide parameters - has own login.

2. Operators (typically machine operators, material handlers, and other production workers) - who use shared devices (which have their own device logins) for transactional data capture. These users do not have their own logins - but each operator needs to be entered into the users table in BellHawk through the system administrator's user setup screen along with their badge barcode, which is used to identify members of this class of users.

3. Staff users - including managers - each has their own login for performing operations management tasks such as entering and managing work, purchase, picking, and shipping orders. May be assigned one or more roles, which limit their scope of action. These users may also be given a transactional data capture role.

4. View only user - have their own logins - can run reports and see status screens. Can be limited to data relating to specified customers or projects.

Each device used for transactional data entry (by one or more operators) requires a DAL (Device Access License). These devices can be setup in the table for devices in the BellHawk database through the systems administrator's device setup screen in BellHawk.

Staff and manager logins each require a CAL (Client Access License). A CAL is required for each user the system administrator designates as a staff user, when the user is setup in the user table in the BellHawk database through the systems administrator user setup screen in BellHawk.

View-Only logins for viewing screens and running reports each require a VCAL (View Only Client Access License). Users are designated as view-only in the user table setup by the systems administrator through the systems administrator user setup screen in BellHawk.

Please note that the system administrator is warned if they attempt to setup too many users in each class through the users setup screen. Also BellHawk, while running, periodically checks that the license file has not been modified and that the number of devices and user licenses setup in the database correspond to the license file contents.

As a result, BellHawk can use an open database architecture without fear that someone will modify the number of users or devices directly in the database and thus circumvent the licensing model. If someone attempts to do this then BellHawk will come to a halt for all users and stop working for all users except the systems administrator.

Server, Company, and Plant Identification

One of the concerns about using a license file, such as that used by BellHawk, is that, while encrypted, its contents are simply an ASCII text string of hexadecimal number that could be simply copied and sent to another company, which could use the license-file without paying a fee.

To make this less convenient, we require that the computer name for the Windows Server being used exactly match the computer name used in the license-file. This will not prevent another organization from using an identical computer name, such as "BellHawk Server" for a computer on their network and, as a result, circumventing this licensing check.

We deliberately do not prevent this, such as by requiring the MAC address be part of the license file, to enable our clients to quickly and easily stand up a replacement server, in the event of a server failure.

We also require that the Company and Plant name, as well as the City, State, and Country entered by the BellHawk Systems Administrator at setup time exactly match those in the license file issued by BellHawk Systems.

This company and plant name and address information is what appears as the company information on all reports plus purchase orders, work orders, and ship orders. Practically this makes it inconvenient for the software to be used by another industrial organization.

Finally, BellHawk is an English language only product, which only supports the extended ASCII character set. This effectively precludes its use in China and Russia, which have weak

intellectual property protection and only enables its effective use in the USA and (British) Commonwealth countries such as Canada, Australia, and New Zealand, which have strong intellectual property legal protections.

Commentary

The BellHawk licensing scheme is a tradeoff between simplicity of administration and ease of use contrasted to the issue of unlicensed usage of the software.

We believe that we have erred on the side of simplicity of administration and ease of use, with some prudent safeguards.

In doing that we are aware that, given enough computing power and samples of our license files, someone could "break" our encryption scheme and decode the encrypted ASCII hex code in the license-file into the raw binary code which contains the actual license coding information.

More likely is that someone will simply install an existing "copied" license-file along with a copy of BellHawk and mimic the setup of the original licensee. Then they can use the BellHawk software without paying a license-fee, at least until our lawyers find out.

In fact, we deliberately issue "Test" and "Development" licenses to our users, which are essentially copies of their operational licenses for use in testing, training, and interface development, at no additional charge.

Our biggest protection against intellectual property theft is the fact that we really try to get to know our clients very well, not only as customers, but as friends and colleagues. The staff at our clients know that if they run into an operational problems they can reach out to us anytime and we will do our best to solve their problem as quickly and cost-effectively as possible.

As a result, we trust our clients and only make the licensing as complex as is needed to enable systems administrators to control the usage of their BellHawk system within the legally licensed usage parameters.