

### BellHawk Data Sheet Systems Architecture



BellHawk is an open-architecture software platform. It can be used as ready-to-use packaged software or, for those organizations installing BellHawk in their own data center, it can be used as a powerful software development platform, which can be customized and integrated into their own IT infrastructure to support complex requirements.

The BellHawk software consists of a specialized website and a SQL Server database that run on a Windows Server computer. All user interaction is performed using web-browser based devices.

The BellHawk software can be installed “in the Cloud” at a remote data center or installed on a Windows Server within the facility within which it will be used.

For data collection these can consist of devices such as PCs or Android tablets that have external corded or cordless barcode scanners which are used for data capture. These devices can also include ruggedized PDAs with integral barcode scanners as well gun-style units equipped with long-range scanners, which are suitable for scanning from the seat of a fork-lift truck. Data viewing can be done using these same devices as well as using smart phones and tablets.

This data collection and viewing can take place over a local area network, over a wired Internet connection, or over a mobile phone data network, anywhere there is an Internet connection to the server computer.

Industrial Internet of Things (IIOT) devices in each facility enable communications between barcode label printers, weighing scales, RFID scanners, and other systems and devices in each local manufacturing plant or warehouse and the BellHawk software, which can be run in the Cloud or at a remote corporate data center. Please see the BellHawk data sheet on IIOT Devices.

Where multiple manufacturing plants or distribution warehouses are to be supported then each can have its own website and database running on one or more Windows Servers in the data center. This enables the people in each plant or distribution center to only see their own materials and operations, to avoid confusion. At the same time materials can be tracked from one plant or warehouse to another and roll-up global reporting across all locations can easily be performed.

Because it is Internet based, BellHawk is ideal for tracking materials, their processing, delivery, and installation across multiple geographic locations. This includes tracking materials on trucks (warehouse-on-wheels), the delivery and pick up of materials, as well as materials on consignment at many locations.

Every plant or distribution warehouse gets their own private website(s) and database(s). Also communications between data capture and viewing devices and the IIOT boxes and BellHawk is encrypted. This helps ensure security and privacy of data.

The use of a private website and database for each plant or distribution warehouse also enables clients to rapidly deploy BellHawk by using BellHawk on a Software-as-a-Service basis and then to easily migrate to using BellHawk on their own servers simply by moving the website and database overnight.

BellHawk is based on a rules-based expert system concept that enables organizations using BellHawk to rapidly configure BellHawk for their own specific data collection requirements. Please see the BellHawk data sheet on “User Defined Parameters” for details.

This same rules-based concept is used to make it easy for material handlers, machine operators and other trades people to use BellHawk to capture data, even if they are not very computer literate. Please see the BellHawk data sheet on “Magic Forms Data Collection”.

A rules-based expert system concept is also used for on-demand printing of barcode labels and/or RFID tags using barcode label printers in each facility. Instead of the user needing to select the correct label format and fill in the data, before printing a label, this is done automatically based on client defined rules which speeds processing of materials and prevents mistakes.

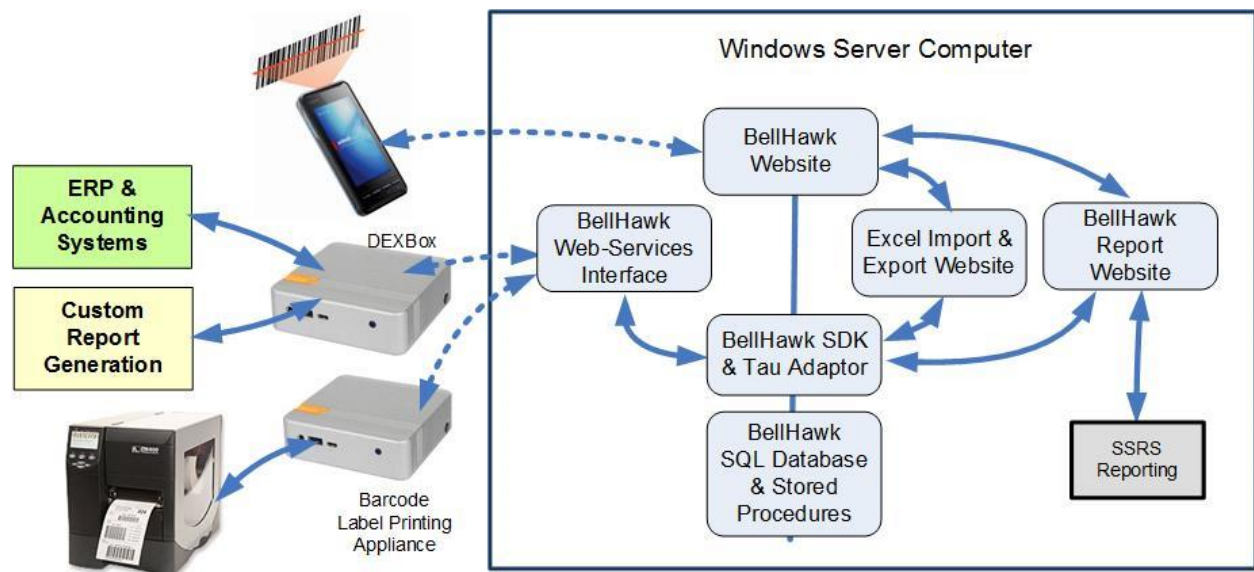
The BellHawk barcode label printing software (TAG) is normally run in an IIOT Barcode Label Printing Appliance (BLPA) in each warehouse or manufacturing plant. The BLPA communicates with BellHawk over the Internet without needing any special IT setup, such as “holes” in the security firewall.

The BLPA simply needs a regular Internet connection to get a small amount of information about what needs to be printed and then translates this to the large volume of printing data, typically needed by a Barcode label printer, which it sends to the selected barcode label printer over the local area network. Please see the BellHawk data sheet on Barcode Label Printing for details.

BellHawk has a wide range of interfaces which can be used to exchange data with BellHawk. These interfaces range from the ability to use Excel spreadsheets or comma delimited files, to a message-based web-services interface, and the ability to interact with a local “mirror” of the BellHawk database even when the BellHawk database is in a remote data center many thousands of miles away.

These interfaces can be used to automatically exchange data with ERP and accounting systems as well as with Engineering Design CAD systems, CRM and E-Commerce systems. Some of these interfaces are installed in IIOT appliances to make it easy to communicate between systems installed in a local facility with BellHawk installed at a remote data center. Others are installed in the same data center as BellHawk to facilitate communications with other systems installed in the same data center or with other Cloud-based systems.

Please see the BellHawk data sheet on BellHawk Interfaces for more details.



The BellHawk website is written in ASP.Net and runs on a Windows Server computer as a set of IIS processes. The BellHawk database is a Microsoft SQL Server database which can be SQL Server Express for smaller applications or SQL Server Standard for those users wishing to integrate their own reports using SSRS. It contains many stored procedures and views that are used by the BellHawk code.

At the core of BellHawk is the Tau Adaptor expert system and the SDK interface to it (BHSDK). This Dynamic Link Library (DLL) is used by BellHawk to interact with its own database in terms of High-Level-Data-Objects (HLDOs), which are used throughout BellHawk. This contains the licensing code for BellHawk and enables licensing to be easily updated by simply issuing a new encrypted licensing file for BellHawk.

IIOT appliances, such as the DEXBox and BLPA interact with BellHawk through a SOAP/XML web-services interface. This same interface can be used by any external device or system to interact with the Tau Adaptor through the BHSDK to perform any data collection or extraction function that is available through the Website user interface.