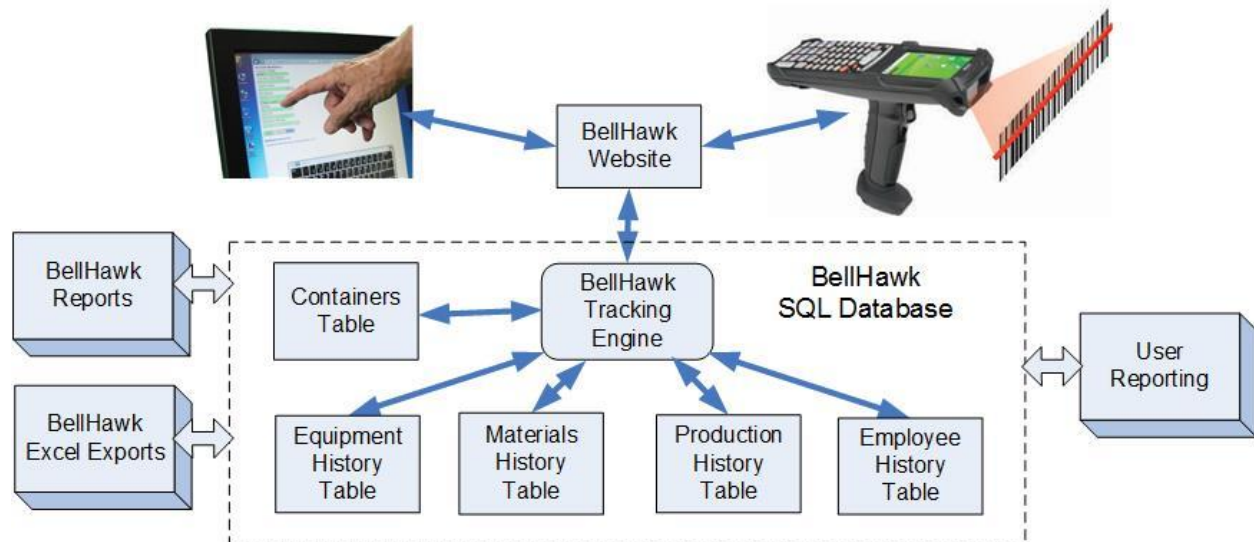## BellHawk Data Sheet
Creating Custom Reports

Introduction

BellHawk comes with a set of reports that cover most standard operations and materials tracking requirements. Also "reports" such as barcoded receiving and picking sheets, as well as purchase, work, and ship orders can be customized in a limited way, such as by using the client's logo instead of the BellHawk logo, and by adding fields to the header and lines on these "reports".

These standard reports, along with related Excel exports, usually meet the requirements of most organizations, until they start using User Defined Parameters, such as length, width, and color as attribute parameters for items. Then users start requiring reports, such as for the number of square feet of red product was made last month, which are not standard reports.

In this document we explain how users can generate their own custom reports, including custom versions of travelers, picking sheets, and the like.

Alternatives for Generating Custom Reports

1. Use the DEX data exchange interface as the basis of generating custom reports using these same tools, when BellHawk is running at a remote data center.

2. Directly access the BellHawk database and use tools such as SSRS (SQL Server Reporting Service), Access, or Crystal Reports to develop you own reports. With SSRS these can be integrated with standard BellHawk reports to create a uniform user interface.

3. Augment the report generation code website in BellHawk with your own report generation website to integrate your reporting with that provided in BellHawk

4. Customize the BellHawk reporting website application or the BellHawk Excel export application.

## Directly Accessing your BellHawk Database

Over the years many BellHawk clients have developed extensive sets of custom reports directly from the BellHawk database using a wide variety of reporting tools. Some have also developed their own custom web-portals to provide their users with charts and graphs and other operational displays.

The BellHawk SQL database is an open architecture database with an extensive set of views to assist in retrieving data from the database. Most of the tables from which reports are produced are self-explanatory and are also well documented in the form of HLDO (High Level Data Object) descriptions. Please see user manuals on HLDOs on the BellHawk website for details.

If you have BellHawk installed on your own Windows Server on the same local area network (LAN) as your PCs then you can simply link your reporting tool to the ODBC driver for the local SQL database.

If you are running BellHawk in the Cloud on a server then we recommend using the DEX interface to access the transactional data captured by BellHawk.

Architecture of BellHawk internal Report Generation Mechanism
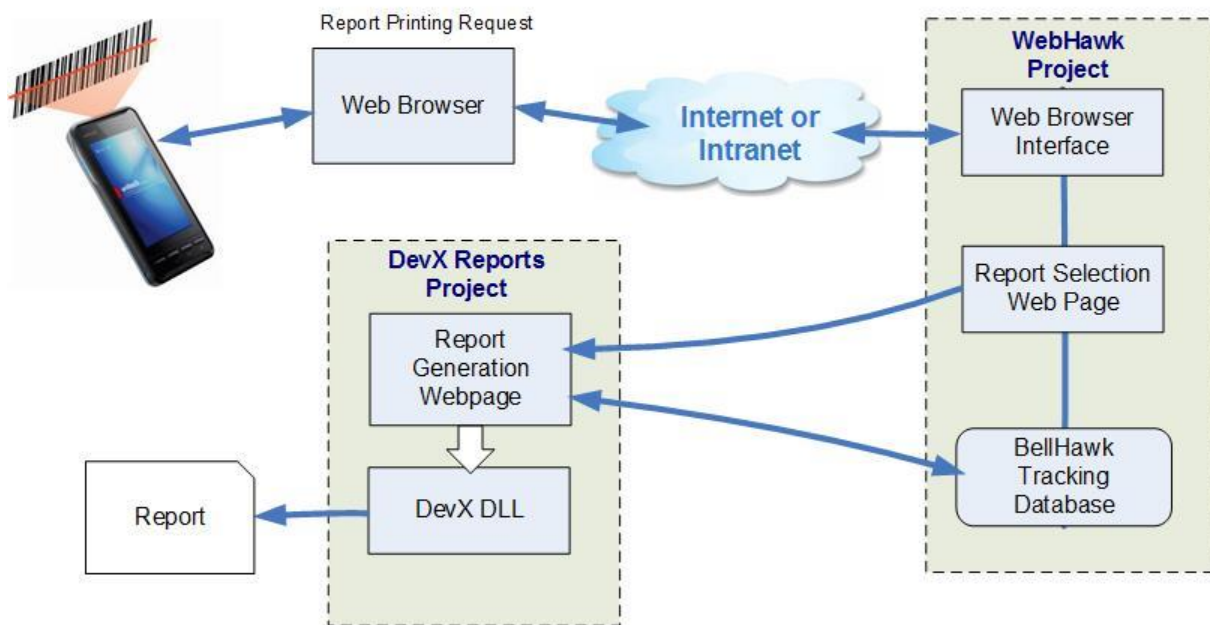
In BellHawk, the reporting mechanism uses a separate website application to produce reports. The purpose of this was to enable users to replace the report generation website with their own custom code for specific reports.

When a user, on a web-browser based device, makes a request for a specific report, they are first taken to a screen from which to select the parameters for the report (such as reporting inventory at a specific facility and/or material type).

The selected report parameters are then placed in a print queue entry and an Internet link (in a separate web-browser tab) is made to the website URL specified to handle that specific report, with the index into the report queue as a parameter of the link.

The report website then retrieves the print queue entry (either by direct access to the SQL database or using the BellHawk SOAP/XML web services interface) and then generates the report.

In the case of BellHawk's own reports, the Developer Express (DevX) reporting DLL is used to generate the reports based on directly accessing the BellHawk database (as both BellHawk and the reporting website application are installed together, running under IIS).

The same mechanism is used for producing other "reports" such as Purchase Orders, Barcoded Pick Sheets, Work Order Travelers, Ship Order Acknowledgements, Packing Slips, and Bills of Lading. All these reports can be customized, if needed, to meet specific end-user requirements.

A similar mechanism exists for creating custom Excel exports, through the BellHawk Excel import-export mechanism. This uses the Flexel DLL to import and export Excel files.

Providing Alternate Reports for BellHawk Reports

The reports are setup in tblReports, which can be imported and exported using DEXEL as the HLDO with keyword "Reports".

The key fields in tblReports are:

1. Report Name

2. URL to link to page generating reports

3. Template - report template to be used - such as a SSRS rdl file or the corresponding template file used by DevX or Flexel - optional

4. Dataset - dataset name - may be used for reporting - optional

5. Printer Name - optional

Users can replace the URL and other data with a link to their own reporting website, such as one generated using SSRS.

The contents of the reports print queue entries are:

1. Report Name - corresponds to setup data in tblReports

2. UDP - report parameter values in a JSON UDP field

3. Status - W (waiting), P (being processed), E (Error), C (Completed)

4. Date-Time request entered

5. Error Message - for reporting print error

Note that it is expected that the website handling the report will not only read the print queue but also update its status once the report is completed. This can be done by accessing the BellHawk database or using the BellHawk web services interface to read and write the queue entry.

The parameter values are specified in BellHawk standard JSON format with the parameter names being those for the HLDO being reported on.

There is a mechanism for users to specify which parameters can be selected for report generation. This enables BellHawk to perform the following functions:

1. Presenting the user with just the reports that they are allowed to view and enabling report selection.

2. Collecting parameters for the lookup to pass to the report generation web page

3. Writing the report name and its parameters into a print queue

4. Sending to the report's web page the value of the index in the queue as the value of the form data for the submission.

The BellHawk reports app then get the report name and its parameters from the print queue in the BellHawk database and display the report in a new browser tab.

Commentary

Developing custom reports based upon the DEX interface is very straight forward using any standard report generation tool. These reports are, however, separate and not integrated within the BellHawk user interface.

Integrating reports and Excel exports within the user interface can be performed using tools such as SSRS running on the same server as BellHawk or by customizing the BellHawk reporting code.