

## dispatch-courier

A utility to watch a directory or database for newly created files or rows and forward them to the Bryx Cloud for use in Mobile or Station Alerting.

The software can watch a directory for newly written files for use with “reporting” or RMS interfaces that are typically available for computer aided dispatching systems. Alternatively, it can connect to a database and execute queries and process their results.

In file watching mode, the service only processes files when they are created. In database mode, a query is (or queries are) executed at a configurable interval. A single query can be provided directly in a configuration file, or a series of queries can be

## Compilation

The application is written in Go and can be cross compiled for Windows and Linux (64-bit). The application requires an ODBC library for compilation. This is included on Windows. For ODBC support on Linux/Unix/macOS, install unixODBC. See <https://github.com/alexbrainman/odbc/wiki/GettingStarted>

```
$ go build github.bryx.com/bryx911/dispatch-courier
```

To build with unixODBC bindings on Unix systems, pass the location of the library via CGO\_CPPFLAGS and CG\_LDFLAGS. For macOS systems using Homebrew:

```
CGO_CPPFLAGS=-I/opt/homebrew/Cellar/unixodbc/2.3.11/include/  
CGO_LDFLAGS=-L/opt/homebrew/Cellar/unixodbc/2.3.11/lib  
go build github.bryx.com/bryx911/dispatch-courier
```

On Linux systems, `-lodbc` is likely sufficient to point to the installed `libunixodbc-dev` package.

When building for production, the application version, operating system, and architecture is passed to the compiler:

```
GOOS=$OS GOARCH=$ARCH GODEBUG=netdns=cgo CGO_LDFLAGS="-lodbc" go build -ldflags "-X main.Version=1.0.0" -o dispatch-courier
```

## Installation and Setup

This is a standalone command line executable. Command-line arguments or a configuration file can be used to augment the application’s behavior. Dispatch Courier should be run as a service (or daemon) to ensure continuous uptime in the event of system changes or restarts or application crashes.

For Windows-based systems, we recommend using our simple wrapper software available at <https://downloads.bryx.com/dispatch-courier>. This automatically installs the software as a service and provides shortcuts to start/stop/pause the service and simple configuration management.

## Authentication

This software requires two pieces of authentication information, provided by Bryx:

- The *Provider Token* identifies and authenticates a particular data provider, this should be kept secret.
- The *Destination ID* determines how the data should be processed by the Bryx system and to which agency or agencies the resulting data should be linked.

## Usage

Configuration settings for processing and sending data can be passed via command-line arguments or a configuration file:

```
dispatch-courier --path /tmp/cad -t "mytoken" -d "destid"
```

A configuration file can be used to specify multiple options at once for convenience. A `config.json` file in the same working directory as the executable provides for this. Each key in the JSON document corresponds to the command-line name. An example configuration for file watching mode and database mode are provided below.

## Configuration

Three arguments are required: `path`, `provider-token`, and `destination-id`. Other options can change the behavior of `dispatch-courier` to meet your particular needs. Use `dispatch-courier --help` at the command line for a listing of available options, or use the configuration wrapper software (Dispatch Courier Manager) for a graphical user interface to edit/manage configuration options.

For assistance in generating a configuration file, contact Bryx Support.

## Endpoints

Dispatch Courier is designed to, and by default will, send data to the Bryx call dispatching API endpoint, which will treat the incoming data as related to a new or existing incident and process it accordingly. However, Dispatch Courier can also be used for processing AVL data if that data is available in a database. The user must supply, if using for AVL, a mapping of what columns in the database table correspond to the Bryx-supported fields for AVL (latitude, longitude, vehicle ID, etc.)

## Operating Modes

Dispatch Courier can operate in either a file-watching mode or a database-watching mode.

In file-watching mode, given a directory, the application will use operating system APIs to determine when new files are written to that directory. It will continually attempt to move the file (or optionally copy it) into a ‘processing’ directory, which will only be possible when other applications close their file handles, and it is not ‘owned’ by another process. Once the move/copy is complete, it will read the contents of the file, send it to the Bryx Cloud for alerting, and delete the file if configured to do so.

File-watching mode can be configured to ignore temporary files by setting `ignoreTempFiles` to `true` in the `files` configuration. When enabled, files ending in `.tmp` or `.temp` are ignored during startup scans and live directory watching.

In database-watching mode, the application will query a provided database at a configurable interval and send the result of that query up to the Bryx Cloud for alerting. There are three options available for executing queries. Database cursors will be closed following the execution of each query.

### “Simple” Database Mode

In “simple” mode, queries will be periodically made via a query of the preset form:

```
SELECT * FROM {Table} WHERE {DateCol} > {Timestamp Of Last Query}
```

It is required to provide the table information and a column of type DATETIME for comparison. This is to limit the scope of queries and reduce strain on the database.

### “Custom” Database Mode

Alternatively, the application can run a user-supplied query. This query can be a `SELECT` with any clauses, and a `WHERE` clause will not be enforced. The software will automatically find and replace the token `@DateVal` with the timestamp of the last execution of a query, to allow properly limiting of the query to only new records since the last check, i.e.:

```
WHERE [DateTimeColumn] > @DateVal
```

Where `[DateTimeColumn]` matches the table’s schema. `@DateVal` should be present verbatim - this will be replaced by the Dispatch Courier software based on the system’s time and polling interval.

The datetime column selection minimizes server impact by ensuring the query results will only contain records that have been modified/created since the last query. The polling interval is configurable as well, see below.

Custom queries can also be used without using `@DateVal` replacement (i.e., just check since the last 5 seconds using `DATE_ADD`), or without `WHERE` clauses at all, but be mindful of causing unnecessary load on the database server.

## “File” Database Mode

Dispatch Courier can perform one or many arbitrary queries that can be sourced from files in a given directory. In complex setups, it may be more useful to keep .sql files with properly formatted queries or to simply keep queries in a different location than Dispatch Courier-specific configuration. The application will source files and execute them in alphabetic/numeric order based on the filename. For example, 01-query.sql will be executed before 02-query.sql. Both queries will be run at each polling interval, however.

## Error Codes

Unrecoverable application errors will be logged with an error code to simplify debugging and troubleshooting. The possible error codes are referenced here. Any fatal crashes without an error code should be reported, with logs, to Bryx Support. See the Bug Reporting section.

| Error Code | Description                                          | Fix                                                                                                                                                                                                         |
|------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01         | Configuration file unable to be parsed               | Validate that the file is valid JSON using a JSON validator/linter. Check for dangling commas, extraneous brackets, unescaped quotes, etc.                                                                  |
| 02         | Configuration file format invalid                    | The configuration file is invalid. It is either missing dependencies or contains invalid settings. Use the GUI to create a configuration file from scratch or work with Bryx Support to identify the issue. |
| 03         | Configuration file format invalid (legacy schema)    | A legacy (version 1 schema) configuration file loaded, but the settings contained within are invalid. Ensure all required parameters are set correctly for either file or database mode.                    |
| 04         | Configuration file format invalid (during migration) | Legacy configuration file loaded, but settings found to be invalid during migration to new schema. Ensure all required parameters are set correctly.                                                        |
| 05         | Undefined operating mode                             | Parameters for both file and database mode were passed in to the application. Choose only one operating mode and its required parameters.                                                                   |

| Error Code | Description                             | Fix                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 06         | Error defining processing path          | The provided processing directory does not exist and could not be created. Confirm that it is a valid file path. Note that if you provided a relative path, it is concatenated to the operating Path.                                                                                                                                                                                                                |
| 07         | Unable to scan directory                | The NoScan option was unset or set to false, and during the initial scan, a file system error occurred. Check that the application has the appropriate permissions to access the directory and that the directory is valid and available.                                                                                                                                                                            |
| 08         | Unable to move file during initial scan | The NoScan option was unset or set to false, and during the initial scan, a file was found and an attempt was made to move it to the processing directory, but a file system error occurred. Check that the application has the appropriate permissions to access the directory and that the directory is valid and available. Ensure another process has not deleted the file in competition with dispatch-courier. |
| 09         | Invalid Endpoint specified              | The Endpoint provided in the configuration was an invalid value. It must be either 'avl' or 'dispatch' (for AVL data or call data, respectively)                                                                                                                                                                                                                                                                     |
| 10         | HTTP proxy configuration error          | The provided URL to use as an HTTP proxy is invalid and could not be used. Ensure there are no typos in the URL and it is a validly formatted URL (RFC 1738)                                                                                                                                                                                                                                                         |
| 11         | Unable to make data request             | The application was not able to complete the HTTP request to send data. Error details follow. Ensure that the network configuration does not prevent connectivity to Bryx and that, if using a proxy, it is accepting connections. Use the error details for further troubleshooting.                                                                                                                                |
| 12         | Bryx server error (HTTP 5xx)            | While sending data, an HTTP response code of 500 or greater was received, indicating a server error. The request will be retried on an exponential backoff, but this should be reported to Bryx. Bryx infrastructure monitoring will also be notified automatically by the server which threw the error.                                                                                                             |
| 13         | Client error (HTTP 4xx)                 | While sending data, an HTTP response code of 400 or greater was received, indicating a client error. The request will be NOT be retried. This is either a configuration error, such as an invalid provider token or destination ID, malformed data, or an undefined application error that should be reported to Bryx.                                                                                               |

| Error Code | Description                                     | Fix                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14         | File system error deleting file                 | After sending the contents of a file to the cloud, a file system error prevented the file from being deleted. Check that the application has the appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier.                            |
| 15         | Error creating file system watcher              | A file system error prevented the application from spawning a watcher/watchdog. Check that the application has the appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier.                                                          |
| 16         | Error moving or copying data file to processing | A file system error prevented the application from copying or moving a file found by the watcher/watchdog into the processing directory. Check that the application has the appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier. |
| 17         | Error reading data file                         | A file system error prevented the application from reading/opening a file found by the watcher/watchdog. Check that the application has the appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier.                                 |
| 18         | Error deleting data file                        | The Keep flag was not set or set to false, and when attempting to remove a processed file, a file system error occurred. Ensure the application has appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier.                         |

| Error Code | Description                               | Fix                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19         | Directory watcher error                   | The file system watcher/watchdog encountered an error when attempting to monitor the provided Path. Specific error details will follow. This is typically a file system error. Ensure the application has appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier.                                |
| 20         | Error attaching Path to directory watcher | The file system watcher/watchdog encountered an error when attempting to begin monitoring the provided Path, after initialization. Specific error details will follow. This is typically a file system error. Ensure the application has appropriate permissions to access the containing directory, that the directory is valid and available, and that the file is being created with appropriate permissions. The file could have been deleted by another interface software in competition with dispatch-courier. |
| 21         | Error opening database connection         | The application was unable to open a connection to the specified database server. Check that the connection information is correct and that the database is reachable from the machine running dispatch-courier.                                                                                                                                                                                                                                                                                                      |
| 22         | Error validating database connection      | A connection was opened to the specified database server, but it did not respond to a ping (health check). Check that the connection information is correct, the database type is correct and matches your database, and that the database is reachable from the machine running dispatch-courier.                                                                                                                                                                                                                    |
| 23         | Error executing query                     | A provided query was executed on the connected database server, but the server returned an error. Try running the query by hand for troubleshooting. Ensure references to databases, tables, etc. are correct, the query syntax is correct, and all logic is correct.                                                                                                                                                                                                                                                 |
| 24         | Error parsing query response              | The provided query executed and did not return an error, but the application was unable to read what columns were returned by the query. Ensure the query's syntax is correct and that at least one column is selected in scope.                                                                                                                                                                                                                                                                                      |
| 25         | Error scanning rows                       | The provided query executed and did not return an error, but the application was unable to read the rows that were returned by the query. Ensure the query's syntax is correct and that at least one column is selected in scope. A properly formed query that returns zero rows should still not encounter this error.                                                                                                                                                                                               |

| Error Code | Description                                                                 | Fix                                                                                                                                                                                                                            |
|------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26         | Unable to serialize row                                                     | While processing a row of an executed query, the application was unable to serialize the data into JSON for submission to Bryx. This should only happen if a row has malformed data or a connection is broken with the server. |
| 27         | AVL query does not return column matching provided ID field                 | An AVL query provided does not match the provided field for the unit/resource identifier (AVL.IdField in configuration). Check that the column specified in the query matches the name provided in the configuration file.     |
| 28         | AVL query does not return column matching provided Latitude field           | An AVL query provided does not match the provided field for the Latitude (AVL.LatitudeField in configuration). Check that the column specified in the query matches the name provided in the configuration file.               |
| 29         | AVL query does not return a valid 32-bit floating point number for Latitude | The query provided returns a value for Latitude, but it is not parseable as a 32-bit number. Correct the query or contact Bryx Support for adding additional conversion logic.                                                 |
| 30         | AVL query does not return column matching provided Longitude field          | An AVL query provided does not match the provided field for the Longitude (AVL.LongitudeField in configuration). Check that the column specified in the query matches the name provided in the configuration file.             |

| Error Code | Description                                                                  | Fix                                                                                                                                                                                                                                                                                                                                                  |
|------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 31         | AVL query does not return a valid 32-bit floating point number for Longitude | The query provided returns a value for Longitude, but it is not parseable as a 32-bit number. Correct the query or contact Bryx Support for adding additional conversion logic.                                                                                                                                                                      |
| 32         | Error reading SQL query files from specified directory                       | A file system error prevented the application from reading/opening files in the specified directory to be used as queries in database mode. Check that the application has the appropriate permissions to access the containing directory, that the directory is valid and available, and that the files and directory have appropriate permissions. |
| 33         | No SQL query files found in specified directory                              | There were no files in the specified directory to be used as queries in database mode. Check that the specified path is correct, the application has the appropriate permissions to access the containing directory, and that the file and directory have appropriate permissions.                                                                   |
| 34         | Undefined query mode                                                         | A database query mode was not specified in the configuration, and the application cannot proceed. Specify one of the query modes in the configuration. See the README for more information.                                                                                                                                                          |
| 35         | Undefined query directory in file query mode                                 | A location/path for query files was not specified in the configuration, but the configuration indicates it should operate in file mode. Make sure that the format of the configuration file is correct and that a valid path is provided.                                                                                                            |
| 36         | Undefined query in custom query mode                                         | A custom query was not provided, but the configuration indicates it should operate with a custom query. Make sure that the format of the configuration file is correct and that a query is provided.                                                                                                                                                 |

| Error Code | Description                                                                | Fix                                                                                                                                                                                                                        |
|------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 37         | Error opening Motorola Flex DataExchange connection                        | The DataExchange server specified by hostname and port in the configuration file did not respond to a TCP socket. Check that the server is configured properly and the values provided are correct.                        |
| 38         | Invalid data for sending comment via Motorola Flex DataExchange connection | The incident number or comment text constructed to send to a Motorola DataExchange server were empty. Check that the query which fetches call data responds with a valid incident number. Otherwise, contact Bryx Support. |
| 39         | Unable to open Websocket connection to Bryx API.                           | Unable to open Websocket connection to Bryx API for 2-way interface. Retry, check networking/firewall configuration, or contact Bryx Support.                                                                              |
| 40         | Unable to read message from Websocket connection to Bryx API.              | Unable to read from opened Websocket connection to Bryx API for 2-way interface. Retry, check networking/firewall configuration, or contact Bryx Support.                                                                  |

| Error Code | Description                                                         | Fix                                                                                                                                                                   |
|------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 41         | Unable to process message from Websocket connection to Bryx API.    | Unable to process data from opened Websocket connection to Bryx API for 2-way interface. Retry or contact Bryx Support.                                               |
| 42         | Invalid or unexpected payload received via Websocket from Bryx API. | Unable to process data from opened Websocket connection to Bryx API for 2-way interface. Retry or contact Bryx Support.                                               |
| 43         | Incident ID missing from Bryx Websocket payload.                    | Unable to process data from opened Websocket connection to Bryx API for 2-way interface. Retry or contact Bryx Support.                                               |
| 44         | Error reconnecting to Bryx API via Websocket.                       | Unable to re-open Websocket connection to Bryx API for 2-way interface. Retry, check networking/firewall configuration, or contact Bryx Support.                      |
| 45         | Sending comment to Flex for SCU acknowledgment failed.              | Unable to submit a comment to Flex by incident number for 2-way interface. There may be a mismatch in Bryx incident IDs and Flex event numbers. Contact Bryx Support. |

## **Bug Reporting**

Please submit any issues with logs to [support@bryx.com](mailto:support@bryx.com). On Windows, pressing the “Contact Support” button in the wrapper application will automatically submit a support ticket with application and service logs.