HWDB Python Command Line Interface

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Changes!

The HWDB Python Command Line Interface has changed considerably since my last talk:

- Taking Norm's suggestion, the utility is now driven from a config file (which I decided to call a "docket") instead of having many command line parameters
- The hwdb-edit-item command is now obsolete. The new command is hwdb-upload-docket
- Taking Vladimir's suggestion, the user's initial setup config script now extracts the certificate from their p12 file and stores it in a secure hidden folder under the user's home directory. Passwords are no longer sent to the REST API

Current Status

- By working to accommodate the photon detector group (Maritza Gonzales, Alessandro Minotti), it became more apparent what a general-purpose utility might look like (i.e., the subject of this talk!)
- The hwdb-upload-docket script is able to upload items and tests from .csv or .xslt files (and optionally LibreOffice .ods files, if the appropriate Python package is installed)
- The utility can restructure hierarchical data across multiple sheets, if desired
- I have some test code for retrieving data, merging it with new data, and converting data back to spreadsheet form, but it is not incorporated into the utility yet.
- I have some test code for reading multiple records (at a rate of about 100/sec) and checking to see if an “alternate ID” has already been uploaded, to check for duplication.

“Docket” file

- The Docket file has two main sections.
- The “Source” section contains the locations of the spreadsheet data, and the names of the encoders that will be used to process each sheet.
- The “Encoders” section contain information on how sheets should be processed.

alexwagner@Farnsworth: ~/DUNE/advanced-uploa...

```
{
    "Type ID": "Z00100100007",
    "Sources":
    [
        {
            "File": "item-manifest.csv",
            "Encoder": "item"
        },
        {
            "File": "item-manifest-subtable.csv",
            "Encoder": "item-detail"
        },
        {
            "File": "test-bounce.csv",
            "Encoder": "test-bounce"
        },
        {
            "File": "test-bounce-subtable-*.csv",
            "Encoder": "test-bounce-detail"
        }
    ],

    "Encoders":
    [
        {
            "Name": "item",
            "Item Identifier": "Alternate ID",
            "Grouping":
            [
                {
                    "Name": "Specifications",
                    "Key": "Alternate ID",
                    "Members":
                    {
                        "Alternate ID": "string",
                        "Color": "string",
                        "Flavor": "string"
                    }
                }
                                                    36,1          Top
```

Some sample data (Item)

Specification

Datasheet	Color: null Flavor: null Doodads: [] Alternate ID: null

item-manifest.csv

External ID	Country	Institution	Manufacturer	Serial Number	Alternate ID	Batch ID	Color	Flavor
	(US) United States	(186) University of Minnesota Twin Cities			1001		Green	Apple
	(US) United States	(186) University of Minnesota Twin Cities			1002		Red	Cherry

item-manifest-subtable.csv

Alternate ID	Doodad	Weight (kg)	Length (mm)
1001	Gromifier Rod	4.31	321.29
1001	Singlet Decoupler	2.143	89.99
1001	Couplet Desingler	1.982	45.01
1002	Gromifier Rod	4.313	321.24
1002	Singlet Decoupler	2.141	90.01
1002	Couplet Desingler	1.979	44.98

Some sample data (Test)

Test Specification

Test Name	Bounce

Datasheet	Comment: null Alternate ID: null Test Results: []

test-bounce.csv

Alternate ID	Test ID	Operator	Datetime	Temperature (K)	Average Elasticity
1001	20221106-01	Alex	11/06/22 01:48:12 PM	295	0.8493
1001	20221106-02	Alex	11/06/22 01:55:16 PM	275	0.8201
1001	20221106-03	Alex	11/06/22 02:04:57 PM	225	0.7578
1001	20221106-04	Alex	11/06/22 02:15:01 PM	175	0.6797
1001	20221106-05	Alex	11/06/22 02:25:09 PM	125	0.6305
1001	20221106-06	Alex	11/06/22 02:40:17 PM	75	0.5818
1002	20221106-01	Alex	11/06/22 01:48:44 PM	295	0.8467
1002	20221106-02	Alex	11/06/22 01:55:19 PM	275	0.816
1002	20221106-03	Alex	11/06/22 02:05:10 PM	225	0.7625
1002	20221106-04	Alex	11/06/22 02:15:17 PM	175	0.6807
1002	20221106-05	Alex	11/06/22 02:25:42 PM	125	0.6274
1002	20221106-06	Alex	11/06/22 02:40:55 PM	75	0.5797

test-bounce-subtable-1001.csv (+18 rows)

Alternate ID	Test ID	Operator	Datetime	Temperature (K)	Drop Height (cm)	Bounce Height (cm)	Elasticity
1001	20221106-01	Alex	2022-11-06 01:45:06 PM	295	25	21.16	0.8464
1001	20221106-01	Alex	2022-11-06 01:46:02 PM	295	50	42.68	0.8536
1001	20221106-01	Alex	2022-11-06 01:47:08 PM	295	75	64.25	0.8567
1001	20221106-01	Alex	2022-11-06 01:48:12 PM	295	100	84.04	0.8404
1001	20221106-02	Alex	2022-11-06 01:52:11 PM	275	25	20.47	0.8188
1001	20221106-02	Alex	2022-11-06 01:53:16 PM	275	50	41.23	0.8246

test-bounce-subtable-1002.csv (+18 rows)

Alternate ID	Test ID	Operator	Datetime	Temperature (K)	Drop Height (cm)	Bounce Height (cm)	Elasticity
1002	20221106-01	Alex	2022-11-06 01:45:40 PM	295	25	21.36	0.8544
1002	20221106-01	Alex	2022-11-06 01:46:45 PM	295	50	42.48	0.8496
1002	20221106-01	Alex	2022-11-06 01:47:47 PM	295	75	63.11	0.8415
1002	20221106-01	Alex	2022-11-06 01:48:44 PM	295	100	84.12	0.8412
1002	20221106-02	Alex	2022-11-06 01:52:25 PM	275	25	20.29	0.8116
1002	20221106-02	Alex	2022-11-06 01:53:23 PM	275	50	40.92	0.8184

Sources

```
"Sources":
[
    {
        "File": "item-manifest.csv",
        "Encoder": "item"
    },
    {
        "File": "item-manifest-subtable.csv",
        "Encoder": "item-detail"
    },
    {
        "File": "test-bounce.csv",
        "Encoder": "test-bounce"
    },
    {
        "File": "test-bounce-subtable-*.csv",
        "Encoder": "test-bounce-detail"
    }
],
```

File globbing is allowed :-)

Encoders (Item)

Encoder for main sheet

```
"Encoders":
[
    {
        "Name": "item",
        "Item Identifier": "Alternate ID",
        "Grouping":
        [
            {
                "Name": "Specifications",
                "Key": "Alternate ID",
                "Members":
                {
                    "Alternate ID": "string",
                    "Color": "string",
                    "Flavor": "string"
                }
            }
        ]
    },
```

Encoder for detail sheet

```
    {
        "Name": "item-detail",
        "Item Identifier": "Alternate ID",
        "Grouping":
        [
            {
                "Name": "Specifications",
                "Key": "Alternate ID",
                "Members":
                {
                    "Alternate ID": "string"
                }
            },
            {
                "Name": "Doodads",
                "Key": "Doodad",
                "Members":
                {
                    "Doodad": "string",
                    "Weight (kg)": "float",
                    "Length (mm)": "float"
                }
            }
        ]
    },
```

Encoders (Test)

Encoder for main sheet

```
{
    "Name": "test-bounce",
    "Item Identifier": "Alternate ID",
    "Test Name": "Bounce",
    "Grouping":
    [
        {
            "Name": "<Main>",
            "Key": "Alternate ID",
            "Members":
            {
                "Alternate ID": "string",
                "Comment": {"type": "string", "value": "upload docket version 0.1"}
            }
        },
        {
            "Name": "Test Results",
            "Key": ["Test ID", "Operator"],
            "Members":
            {
                "Test ID": "string",
                "Operator": "string",
                "Datetime": "string",
                "Temperature (K)": "float",
                "Average Elasticity": "float"
            }
        }
    ]
},
```

Encoder for detail sheet

```
{
    "Name": "test-bounce-detail",
    "Item Identifier": "Alternate ID",
    "Test Name": "Bounce",
    "Grouping":
    [
        {
            "Key": "Alternate ID",
            "Members":
            {
                "Alternate ID": "string",
                "Comment": {"type": "string", "value": "upload docket version 0.1"}
            }
        },
        {
            "Name": "Test Results",
            "Key": ["Test ID", "Operator"],
            "Members":
            {
                "Test ID": "string",
                "Operator": "string"
            }
        },
        {
            "Name": "Details",
            "Key": null,
            "Members":
            {
                "Datetime": "string",
                "Drop Height (cm)": "float",
                "Bounce Height (cm)": "float",
                "Elasticity": "float"
            }
        }
    ]
}
```

Running the Utility

alexwagner@Farnsworth: ~/DUNE/advanced-upload-demo/demo-1

```
alexwagner@Farnsworth:~/DUNE/advanced-upload-demo/demo-1$ hwdb-upload-docket --docket upload-docket.json
The docket has been processed but not submitted. Use --submit to add the items and/or tests to the database. You may
review the processed contents in item-receipt.json and test-receipt.json.
alexwagner@Farnsworth:~/DUNE/advanced-upload-demo/demo-1$ hwdb-upload-docket --docket upload-docket.json  --submit

Item with alternate id = 1001 was added successfully and assigned external id Z00100100007-00236
Test 'Bounce for alternate id = 1001 was added successfully
Item with alternate id = 1002 was added successfully and assigned external id Z00100100007-00237
Test 'Bounce for alternate id = 1002 was added successfully

alexwagner@Farnsworth:~/DUNE/advanced-upload-demo/demo-1$
```

Item Receipt

alexwagner@Farnsworth: ~/DUNE/advanced-upload-demo/demo-1


```
{
    "1001": {
        "External ID": null,
        "Country": "(US) United States",
        "Institution": "(186) University of Minnesota Twin Cities",
        "Manufacturer": null,
        "Serial Number": null,
        "Batch ID": null,
        "Specifications": {
            "Alternate ID": 1001,
            "Color": "Green",
            "Flavor": "Apple",
            "Doodads": [
                {
                    "Doodad": "Gromifier Rod",
                    "Weight (kg)": 4.31,
                    "Length (mm)": 321.29
                },
                {
                    "Doodad": "Singlet Decoupler",
                    "Weight (kg)": 2.143,
                    "Length (mm)": 89.99
                },
                {
                    "Doodad": "Couplet Desingler",
                    "Weight (kg)": 1.982,
                    "Length (mm)": 45.01
                }
            ]
        }
    },
    "1002": {
        "External ID": null,
        "Country": "(US) United States",
```


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Test Receipt

alexwagner@Farnsworth: ~/DUNE/advanced-upload-demo/demo-1


```
{
    "1001": {
        "Bounce": {
            "Alternate ID": 1001,
            "Comment": "upload docket version 0.1",
            "Test Results": [
                {
                    "Test ID": "20221106-01",
                    "Operator": "Alex",
                    "Datetime": "11/06/22 01:48:12 PM",
                    "Temperature (K)": 295,
                    "Average Elasticity": 0.8493,
                    "Details": [
                        {
                            "Datetime": "2022-11-06 01:45:06 PM",
                            "Drop Height (cm)": 25,
                            "Bounce Height (cm)": 21.16,
                            "Elasticity": 0.8464
                        },
                        {
                            "Datetime": "2022-11-06 01:46:02 PM",
                            "Drop Height (cm)": 50,
                            "Bounce Height (cm)": 42.68,
                            "Elasticity": 0.8536
                        },
                        {
                            "Datetime": "2022-11-06 01:47:08 PM",
                            "Drop Height (cm)": 75,
                            "Bounce Height (cm)": 64.25,
                            "Elasticity": 0.8567
                        },
                        {
                            "Datetime": "2022-11-06 01:48:12 PM",
                            "Drop Height (cm)": 100,
"test-receipt.json" [noeol] 414L, 17586C                                    1,1           Top
```

Possible Enhancements?

- With some tweaking, the utility could allow a sheet to have a different “Decoder” to convert spreadsheets from flat to hierarchical or vice versa.
- Since Sources will change every time, and the Encoders will be more or less constant, the Docket format could allow linking to Encoders from a separate file that would not need to be updated each time.
- The utility could incorporate some default Encoder behavior that would cover simple cases when no Encoder is specified.
- Some streamlining could be done to the Encoder format, e.g., if a “group” was only present to provide a key, is the “Members” node really necessary?
- There are multiple ways to represent a table in JSON. The utility could be changed to accommodate other representations. (Next slide!)

Note on Table Formats

- Currently, the utility essentially stores tables like this:

```
[
    {
        "ID": 1,
        "Name": "Alice",
        "Favorite Food": "Avocados"
    },
    {
        "ID": 2,
        "Name": "Bob",
        "Favorite Food": "Bacon"
    },
    {
        "ID": 3,
        "Name": "Charlie",
        "Favorite Food": "Chips"
    }
]
```

- But maybe some people would prefer this format?

```
{
    "ID": [1, 2, 3],
    "Name": ["Alice", "Bob", "Charlie"],
    "Favorite Food": ["Avocados", "Bacon", "Chips"],
}
```

(If so, it seems only reasonable for leaf nodes, but for those who only care about flat data, it wouldn't make much difference)

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