


```
header
{
  "typ": "JWT",
  "kid": "2BF955C204B55583B4B757DB9B64D169",
  "alg": "RS256"
}
payload
{
  "iss": "https://my.bogus.issuer",
  "aud": "my-audience",
  "iat": 1568906580,
  "nbf": 1568906580,
  "exp": 1568916580
}
```

So why do this? Because the signature is created (this requires the exact payload and cannot be forged) on a server using its private key. To validate the signature, you must use some cryptography and the server's corresponding public key. This means that while, yes, anyone who gets one can look at the header and payload and for that matter verify the signature, you as the recipient know that the signature could only have possibly come from the server. In practice, if you get one, you can trust it is authentic if the signature checks.

Where to get the binaries

You can find these in the file `jwt.tar` in the most recent OA4MP release on github. Download it, unpack it and look at the readme.

The Interpreter

At the very least, you can simply fire up the command line interpreter once everything is unpacked by issuing

```
java -jar jwt.jar
```

```
jwt>
```


If you need to generate extra output, you make issue the `set_verbose_on` command with an argument of `true`. This will make JWT much chattier and dump more things in to the log. You may turn off by setting it to `false`.

Setting shell variables first

Before running the scripts, you should set the environment (assigning values to a couple of shell variables) by running the `set-env.sh` script (typically using the `source` command):

```
source ./set-env.sh
```

Basically you just need to point `java` at the directory where you put the distribution. If you got this as a tarball, then it should all just work from the untarred directory. You only need to set the environment once in your session.

Running Batch (Single) commands

Included are bash scripts that allow you to execute single commands, such as creating keys and so forth. The intent of allowing the interpreter to run single commands is that you can embed them in shell scripts.

So to run a single command with the interpreter, you add the `-batch` flag. Here is how to print out the help for the `create_keys` command:

```
java -jar jwt.jar -batch create_keys --help
```

```
create_keys [-in set_of_keys -public] | [-private] -out file
```

```
  Create a set of RSA JSON Web keys and store them in the given file...
```

(Lots more stuff prints here, I just want you to see how it works.)

So invoking this in the course of a shell script is pretty. There are a few such scripts supplied in the distribution. These invoke a few common single commands. You can invoke detailed help by invoking the script with the --help flag.

E.g.

```
./create_keys.sh --help
```

Note that this invokes a much larger library and the help talks about interactive mode and batch mode. These scripts all run in batch mode.

create_keys.sh = creates a set of standard RSA keys (both public and private parts) at various strengths.

Output is JSON Web Key format.

Create_symmetric_keys.sh = create one (or more) symmetric keys.

create_token.sh = takes a token and simply creates the signature -- no claims added.

generate_token.sh = takes a set of claims and adds all of the standard expirations, possibly a JTI and so forth.

log.sh = prints out the tail of the current log file.

print_token.sh = prints the header and payload of a token. No validation or other checking is done.

validate_token.sh = takes a token and key and verifies the signature.

run.sh = run any command in batch mode.

For instance

```
SCRIPT_PATH/run.sh echo foo!
```

```
foo!
```

**** Batch files**

The processor also has the ability to run batches of commands found in a single file. The syntax of the file is designed to be as minimal as possible:

- * a line that starts with a hash (#) is a comment and is ignored at run time
- * Commands may span many lines with as much whitespace as you like, but the end of command marker is a semi-colon (;) and as soon as that is found, the command will execute. Note that all lines will be put into a single line with a single space between each by the command preprocessor.

These typically end with an extension of .cmd. You can either feed a command file directly to the interpreter:

```
java -jar jwt.jar -batchFile file_name.cmd
```

Or set your environment and use the run-cmd.sh shell script. E.g. to print out the sample token:

```
./run-cmd.sh ex_print_token.cmd
```

and a sample would be printed.

Environment variables.

The command processor has any number of features including the ability to have an environment set either as a Java properties file or as a JSON object. The distro contains two examples

```
test_env.props  
more_props.json
```

How do these work? The key/value pairs are read in and the you simple use \${key} wherever you want.

Note that the substitutions happen before any processing of the command line, so you can literally replace anything you want, including command line switches.

For instance, if your properties file consists of the single line

```
kid=ABC123
```


(Or the equivalent JSON file of

```
{"kid":"ABD123"}
```

would work.)

Then the following command

```
generate_keys -kid ${kid} -jti...
```

would become

```
generate_keys -kid ABC123 -jti ...
```

and then get passed to the interpreter. Note that there is no checking of any sort done -- it is just a straight up string substitution, so you can have something like **MYKEY\${kid}456 ---> MYKEYABC123456** for instance.

You can import environment variables in interactive mode and in batch files. Batch mode is still not supported though that may change. At this point, you must pass in all parameters directly (again since single commands are intended to be run as part of a shell script, the management of parameters is done there).

Here is an example to show how to use environment variables with a command file.

This will write the properties to the console so you can see that it works. In the following file are the commands that import an environment and print out some of it:

```
ex_env.cmd
```

Invoke

```
./run-cmd.sh ex_env.cmd
```

to run the command file (a file containing a set of commands).

