

**Skills  
Network**

## Examples of Pipes

### Learning Objectives

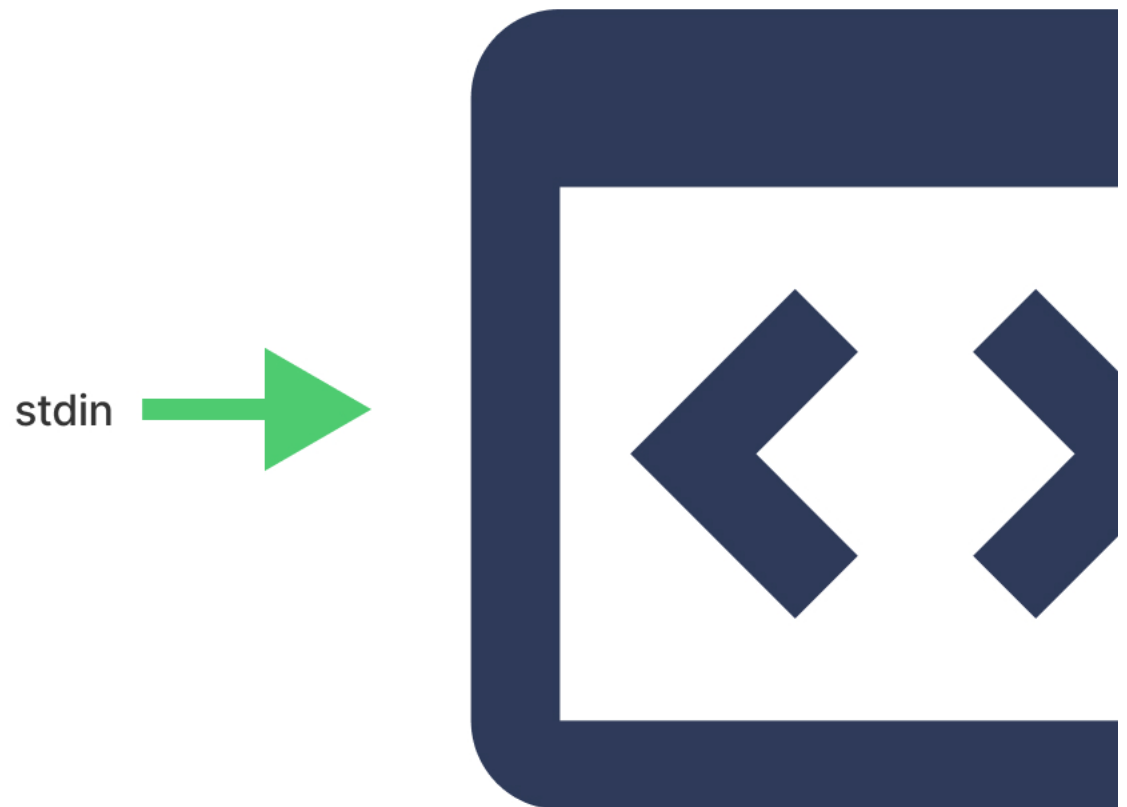
After completing this reading, you will be able to:

- Describe pipes
- Use pipes to combine commands when working with strings and text file contents
- Use pipes to extract information from URLs

### What are pipes?

Put simply, pipes are commands in Linux which allow you to use the output of one command as the input of another.

# Command



Pipes | use the following format:

1. 1
1. [command 1] | [command 2] | [command 3] ... | [command n]

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There is no limit to the number of times you can chain pipes in a row!

In this lab, you'll take a closer look at how you can use pipes and filters to solve basic data processing problems.

## Pipe examples

### Combining commands

Let's start with a commonly used example. Recall the following commands:

- [sort](#) - sorts the lines of text in a file and displays the result
- [uniq](#) - prints a text file with any consecutive, repeated lines collapsed to a single line

With the help of the pipe operator, you can combine these commands to print all the unique lines in a file.

Suppose you have the file `pets.txt` with the following contents:

```
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8

1. $ cat pets.txt
2. goldfish
3. dog
4. cat
5. parrot
6. dog
7. goldfish
8. goldfish
```

Copied!

If you *only* use `sort` on `pets.txt`, you get:

```
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8

1. $ sort pets.txt
2. cat
3. dog
4. dog
5. goldfish
6. goldfish
7. goldfish
8. parrot
```

Copied!

The file is sorted, but there are duplicated lines of "dog" and "goldfish".

On the other hand, if you *only* use `uniq`, you get:

```
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7

1. $ uniq pets.txt
2. goldfish
3. dog
4. cat
5. parrot
6. dog
7. goldfish
```

Copied!

This time, you removed consecutive duplicates, but non-consecutive duplicates of "dog" and "goldfish" remain.

But by combining the two commands in the correct order - by first using `sort` then `uniq` - you get back:

```
1. 1
2. 2
3. 3
4. 4
```

```
5. 5

1. $ sort pets.txt | uniq
2. cat
3. dog
4. goldfish
5. parrot
```

Copied!

Since `sort` sorts all identical items consecutively, and `uniq` removes all consecutive duplicates, combining the commands prints only the unique lines from `pets.txt`!

## Applying a command to strings and files

Some commands such as `tr` only accept *standard input* - normally text entered from your keyboard - but not strings or filenames.

- `tr` (translate) - replaces characters in input text

```
1. 1

1. tr [OPTIONS] [target characters] [replacement characters]
```

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In cases like this, you can use piping to apply the command to strings and file contents.

With strings, you can use `echo` in combination with `tr` to replace all the vowels in a string with underscores `_`:

```
1. 1
2. 2

1. $ echo "Linux and shell scripting are awesome\!" | tr "aeiou" "_"
2. L_n_x _nd sh_ll scr_pt_ng _r_ _w_s_m!
```

Copied!

To perform the complement of the operation from the previous example - or to replace all the *consonants* (any letter that is not a vowel) with an underscore - you can use the `-c` option:

```
1. 1
2. 2

1. $ echo "Linux and shell scripting are awesome\!" | tr -c "aeiou" "_"
2. _i_u_a____e____i_i_a_e_a_e_o_e_
```

Copied!

With files, you can use `cat` in combination with `tr` to change all of the text in a file to uppercase as follows:

```
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8

1. $ cat pets.txt | tr "[a-z]" "[A-Z]"
2. GOLDFISH
3. DOG
4. CAT
5. PARROT
6. DOG
7. GOLDFISH
8. GOLDFISH
```

Copied!

The possibilities are endless! For example, you could add `uniq` to the above pipeline to only return unique lines in the file, like so:

```
1. 1
2. 2
3. 3
4. 4
5. 5

1. $ sort pets.txt | uniq | tr "[a-z]" "[A-Z]"
2. CAT
3. DOG
4. GOLDFISH
5. PARROT
```

Copied!

## Extracting information from JSON Files:

Let's see how you can use this json file to get the current price of Bitcoin (BTC) in USD, by using `grep` command.

```
1. 1
2. 2
```

```

3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. 11
12. 12
13. 13
14. 14
15. 15
16. 16
17. 17
18. 18
19. 19
20. 20
21. 21
22. 22
23. 23
24. 24
25. 25

1. {
2.   "coin": {
3.     "id": "bitcoin",
4.     "icon": "https://static.coinstats.app/coins/Bitcoin6l39t.png",
5.     "name": "Bitcoin",
6.     "symbol": "BTC",
7.     "rank": 1,
8.     "price": 57907.78008618953,
9.     "priceBtc": 1,
10.    "volume": 48430621052.9856,
11.    "marketCap": 1093175428640.1146,
12.    "availableSupply": 18877868,
13.    "totalSupply": 21000000,
14.    "priceChange1h": -0.19,
15.    "priceChange1d": -0.4,
16.    "priceChange1w": -9.36,
17.    "websiteUrl": "http://www.bitcoin.org",
18.    "twitterUrl": "https://twitter.com/bitcoin",
19.    "exp": [
20.      "https://blockchair.com/bitcoin/",
21.      "https://btc.com/",
22.      "https://btc.tokenview.com/"
23.    ]
24.  }
25. }

```

Copied!

Copy the above output in a file and name it as Bitcoinprice.txt.

The JSON field you want to grab here is "price": [numbers].[numbers]". To get this, you can use the following grep command to extract it from the JSON text:

```

1. 1

1. grep -oE "\"price\"\\s*:\\s*[0-9]*?\\. [0-9]*"

```

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Let's break down the details of this statement:

- -o tells grep to *only* return the matching portion
- -E tells grep to be able to use extended regex symbols such as ?
- \"price\" matches the string "price"
- \\s\* matches any number (including 0) of whitespace (\\s) characters
- : matches :
- [0-9]\* matches any number of digits (from 0 to 9)
- ?\\. optionally matches a .

Use the cat command to get the output of the JSON file and pipe it with the grep command to get the required output.

```

1. 1

1. cat Bitcoinprice.txt | grep -oE "\"price\"\\s*:\\s*[0-9]*?\\. [0-9]*"

```

Copied!

You can also extract information directly from URLs and retrieve any specific data using such grep commands.

► [Click here](#) to see the process of extracting information directly from URLs and retrieving specific data:

## Summary

In this reading, you learned that:

- Pipes are commands in Linux which allow you to use the output of one command as the input of another
- You can combine commands such as sort and uniq to organize strings and text file contents
- You can pipe the output of a curl command to grep to extract components of URL data

Authors

Jeff Grossman  
Sam Prokopchuk

Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2024-01-09	1.5	Zehra Afzal, K Sundararajan	Content corrected after deprecation of Bitcoin API
2023-05-23	1.4	Benny Li	QA pass
2023-04-27	1.3	Nick Yi	QA pass
2023-04-14	1.2	Nick Yi	ID Review
2023-03-08	1.1	Jeff Grossman	Added new content
2021-11-09	1.0	Sam Prokopchuk	Initial version created

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