pingparsing Documentation

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PINGPARSING

1.1 Summary

pingparsing is a CLI-tool/Python-library parser and transmitter for ping command.

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TWO

SUPPORTED ENVIRONMENTS

- Linux
- Windows
- macOS

2.1 Tested Environments

OS	ping version
Ubuntu 16.04	`iputils-ping 20121221-5ubuntu2`
Ubuntu 18.04	`iputils-ping 20161105-1ubuntu2`
Ubuntu 20.04	`iputils-ping 20190709-3`
Debian 8.6	`iputils-ping 20121221-5+b2`
Fedora 25	`iputils-20161105-1.fc25.x86_64`
Windows 10	-
macOS 10.13	-

CHAPTER

THREE

PREMISE

`pingparsing` expects the locale at the ping command execution environment with English. Parsing the `ping` command output with any other locale may fail. This is because the output of the `ping` command will change depending on the locale setting.

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FOUR

INSTALLATION

```
pip install pingparsing
```

CHAPTER

FIVE

DEPENDENCIES

- Python 3.6+
- Python package dependencies (automatically installed)

5.1 Optional Dependencies

- **pingparsing[cli] extras**
  - **loguru**
    - Used for logging if the package installed
  - **Pygments**
    - Syntax highlighting to `pingparsing` command output when installed

CHAPTER

SIX

DOCKER IMAGE

thombashi/pingparsing - Docker Hub

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SEVEN

USAGE

7.1 CLI Usage

A CLI command (`pingparsing` command) included in the packaged. The command could do the following:

- Execute `ping` and parse the result
- **Parse ping results from:**
  - file(s)
  - the standard input

7.1.1 Execute ping and parse the result

If you specify destination(s) to the `pingparsing` command as positional arguments, the command executes `ping` for each destination(s) and parses the result. `ping` will execute in parallel for multiple destinations. The parsed result outputted with JSON format.

Listing 1: Execute with a single destination

```
$ pingparsing google.com
{
    "google.com": {
        "destination": "google.com",
        "packet_transmit": 10,
        "packet_receive": 10,
        "packet_loss_rate": 0.0,
        "packet_loss_count": 0,
        "rtt_min": 34.189,
        "rtt_avg": 46.054,
        "rtt_max": 63.246,
        "rtt_mdev": 9.122,
        "packet_duplicate_rate": 0.0,
        "packet_duplicate_count": 0
    }
}
```

Listing 2: Execute with multiple destinations

```
$ pingparsing google.com twitter.com
{
```

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```
    "google.com": {
        "destination": "google.com",
        "packet_transmit": 10,
        "packet_receive": 10,
        "packet_loss_rate": 0.0,
        "packet_loss_count": 0,
        "rtt_min": 37.341,
        "rtt_avg": 44.538,
        "rtt_max": 53.997,
        "rtt_mdev": 5.827,
        "packet_duplicate_rate": 0.0,
        "packet_duplicate_count": 0
    },
    "twitter.com": {
        "destination": "twitter.com",
        "packet_transmit": 10,
        "packet_receive": 10,
        "packet_loss_rate": 0.0,
        "packet_loss_count": 0,
        "rtt_min": 45.377,
        "rtt_avg": 68.819,
        "rtt_max": 78.581,
        "rtt_mdev": 9.769,
        "packet_duplicate_rate": 0.0,
        "packet_duplicate_count": 0
    }
}
```

Listing 3: Print ICMP packet replies

```
$ pingparsing google.com -c 3 --icmp-reply
{
    "google.com": {
        "destination": "google.com",
        "packet_transmit": 3,
        "packet_receive": 3,
        "packet_loss_count": 0,
        "packet_loss_rate": 0.0,
        "rtt_min": 36.997,
        "rtt_avg": 49.1,
        "rtt_max": 60.288,
        "rtt_mdev": 9.533,
        "packet_duplicate_count": 0,
        "packet_duplicate_rate": 0.0,
        "icmp_replies": [
            {
                "destination": "nrt20s21-in-f14.1e100.net (172.217.175.110)",
                "bytes": 64,
                "icmp_seq": 1,
                "ttl": 113,
                "time": 50.0,
                "duplicate": false
```

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```
            },
            {
                "destination": "nrt20s21-in-f14.1e100.net (172.217.175.110)",
                "bytes": 64,
                "icmp_seq": 2,
                "ttl": 113,
                "time": 60.2,
                "duplicate": false
            },
            {
                "destination": "nrt20s21-in-f14.1e100.net (172.217.175.110)",
                "bytes": 64,
                "icmp_seq": 3,
                "ttl": 113,
                "time": 36.9,
                "duplicate": false
            }
        ]
    }
}
```

7.1.2 Parse ping result file

Input

```
$ cat ping.txt
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.

--- 192.168.0.1 ping statistics ---
1688 packets transmitted, 1553 received, +1 duplicates, 7% packet loss,␣
↪time 2987ms
rtt min/avg/max/mdev = 0.282/0.642/11.699/0.699 ms, pipe 2, ipg/ewma 1.770/
↪0.782 ms
$ cat osx.txt
PING google.com (172.217.6.238): 56 data bytes
64 bytes from 172.217.6.238: icmp_seq=0 ttl=53 time=20.482 ms
64 bytes from 172.217.6.238: icmp_seq=1 ttl=53 time=32.550 ms
64 bytes from 172.217.6.238: icmp_seq=2 ttl=53 time=32.013 ms
64 bytes from 172.217.6.238: icmp_seq=3 ttl=53 time=28.498 ms
64 bytes from 172.217.6.238: icmp_seq=4 ttl=53 time=46.093 ms

--- google.com ping statistics ---
5 packets transmitted, 5 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 20.482/31.927/46.093/8.292 ms
```

Output

Listing 4: Parse multiple ping result files

```
$ pingparsing ping.txt osx.txt
{
```

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```
    "osx.txt": {
        "destination": "google.com",
        "packet_transmit": 5,
        "packet_receive": 5,
        "packet_loss_rate": 0.0,
        "packet_loss_count": 0,
        "rtt_min": 20.482,
        "rtt_avg": 31.927,
        "rtt_max": 46.093,
        "rtt_mdev": 8.292,
        "packet_duplicate_rate": null,
        "packet_duplicate_count": null
    },
    "ping.txt": {
        "destination": "192.168.0.1",
        "packet_transmit": 1688,
        "packet_receive": 1553,
        "packet_loss_rate": 7.997630331753558,
        "packet_loss_count": 135,
        "rtt_min": 0.282,
        "rtt_avg": 0.642,
        "rtt_max": 11.699,
        "rtt_mdev": 0.699,
        "packet_duplicate_rate": 0.0643915003219575,
        "packet_duplicate_count": 1
    }
}
```

Listing 5: Print ICMP packet replies

```
$ pingparsing ping.txt osx.txt --icmp-reply
{
    "ping.txt": {
        "destination": "google.com",
        "packet_transmit": 60,
        "packet_receive": 60,
        "packet_loss_count": 0,
        "packet_loss_rate": 0.0,
        "rtt_min": 61.425,
        "rtt_avg": 99.731,
        "rtt_max": 212.597,
        "rtt_mdev": 27.566,
        "packet_duplicate_count": 0,
        "packet_duplicate_rate": 0.0,
        "icmp_replies": []
    },
    "osx.txt": {
        "destination": "google.com",
        "packet_transmit": 5,
        "packet_receive": 5,
        "packet_loss_count": 0,
        "packet_loss_rate": 0.0,
```

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```
        "rtt_min": 20.482,
        "rtt_avg": 31.927,
        "rtt_max": 46.093,
        "rtt_mdev": 8.292,
        "packet_duplicate_count": 0,
        "packet_duplicate_rate": 0.0,
        "icmp_replies": [
            {
                "icmp_seq": 0,
                "ttl": 53,
                "time": 20.482,
                "duplicate": false
            },
            {
                "icmp_seq": 1,
                "ttl": 53,
                "time": 32.55,
                "duplicate": false
            },
            {
                "icmp_seq": 2,
                "ttl": 53,
                "time": 32.013,
                "duplicate": false
            },
            {
                "icmp_seq": 3,
                "ttl": 53,
                "time": 28.498,
                "duplicate": false
            },
            {
                "icmp_seq": 4,
                "ttl": 53,
                "time": 46.093,
                "duplicate": false
            }
        ]
    }
}
```


7.1.3 Parse from the standard input

```
$ ping -i 0.2 -w 20 192.168.2.101 | pingparsing -
{
    "destination": "192.168.2.101",
    "packet_transmit": 99,
    "packet_receive": 88,
    "packet_loss_count": 11,
    "packet_loss_rate": 11.11111111111111,
```

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```
    "rtt_min": 1.615,
    "rtt_avg": 26.581,
    "rtt_max": 93.989,
    "rtt_mdev": 19.886,
    "packet_duplicate_count": 0,
    "packet_duplicate_rate": 0.0
}
```

7.1.4 CLI help

```
usage: pingparsing [-h] [-V] [--max-workers MAX_WORKERS]
                   [--timestamp {none,epoch,datetime}] [-c COUNT]
                   [-s PACKET_SIZE] [--ttl TTL] [-w DEADLINE]
                   [--timeout TIMEOUT] [-I INTERFACE] [--addopts OPTIONS]
                   [--indent INDENT] [--icmp-reply] [--timezone TIMEZONE]
                   [--no-color] [--debug | --quiet]
                   destination_or_file [destination_or_file ...]

positional arguments:
  destination_or_file   Destinations to send ping, or files to parse. '-' for
                        parse the standard input.

optional arguments:
  -h, --help            show this help message and exit
  -V, --version         show program's version number and exit
  --max-workers MAX_WORKERS
                        Number of threads for when multiple destination/file
                        specified. defaults to equals to two times number of
                        cores.
  --debug               for debug print.
  --quiet               suppress execution log messages.

Ping Options:
  --timestamp {none,epoch,datetime}
                        [Only for LINUX] none: no timestamps. epoch: add
                        timestamps with UNIX epoch time format. datetime: add
                        timestamps with ISO time format.
  -c COUNT, --count COUNT
                        Stop after sending the count. see also ping(8) [-c
                        count] option description.
  -s PACKET_SIZE, --packet-size PACKET_SIZE
                        Specifies the number of data bytes to be sent.
  --ttl TTL             Specifies the Time to Live.
  -w DEADLINE, --deadline DEADLINE
                        Timeout before ping exits. valid time units are:
                        d/day/days, h/hour/hours, m/min/mins/minute/minutes,
                        s/sec/secs/second/seconds,
                        ms/msec/msecs/millisecond/milliseconds,
                        us/usec/usecs/microsecond/microseconds. if no unit
                        string found, considered seconds as the time unit. see
```

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```
                        also ping(8) [-w deadline] option description. note:
                        meaning of the 'deadline' may differ system to system.
  --timeout TIMEOUT     Time to wait for a response per packet. Valid time
                        units are: d/day/days, h/hour/hours,
                        m/min/mins/minute/minutes, s/sec/secs/second/seconds,
                        ms/msec/msecs/millisecond/milliseconds,
                        us/usec/usecs/microsecond/microseconds. if no unit
                        string found, considered milliseconds as the time
                        unit. Attempt to send packets with milliseconds
                        granularity in default. If the system does not support
                        timeout in milliseconds, round up as seconds. Use
                        system default if not specified. This option will be
                        ignored if the system does not support timeout itself.
                        See also ping(8) [-W timeout] option description.
                        note: meaning of the 'timeout' may differ system to
                        system.
  -I INTERFACE, --interface INTERFACE
                        network interface
  --addopts OPTIONS     extra command line options

Output Options:
  --indent INDENT       JSON output will be pretty-printed with the indent
                        level. (default= 4)
  --icmp-reply, --icmp-replies
                        print results for each ICMP packet reply.
  --timezone TIMEZONE   Time zone for timestamps.
  --no-color            Turn off colors.

Documentation: https://pingparsing.rtfd.io/
Issue tracker: https://github.com/thombashi/pingparsing/issues
```

7.2 Library Usage

7.2.1 Execute ping and parse the result

`PingTransmitter` class can execute `ping` command and obtain the ping output as a string.

Sample Code

```
import json
import pingparsing

ping_parser = pingparsing.PingParsing()
transmitter = pingparsing.PingTransmitter()
transmitter.destination = "google.com"
transmitter.count = 10
result = transmitter.ping()

print(json.dumps(ping_parser.parse(result).as_dict(), indent=4))
```

Output

```
{
    "destination": "google.com",
    "packet_transmit": 10,
    "packet_receive": 10,
    "packet_loss_rate": 0.0,
    "packet_loss_count": 0,
    "rtt_min": 34.458,
    "rtt_avg": 51.062,
    "rtt_max": 62.943,
    "rtt_mdev": 8.678,
    "packet_duplicate_rate": 0.0,
    "packet_duplicate_count": 0
}
```

7.2.2 Parsing ping command output

Sample Code

```
import json
from textwrap import dedent
import pingparsing

parser = pingparsing.PingParsing()
stats = parser.parse(dedent("""\
    PING google.com (74.125.24.100) 56(84) bytes of data.
    [1524930937.003555] 64 bytes from 74.125.24.100: icmp_seq=1 ttl=39␣
↪time=148 ms
    [1524930937.787175] 64 bytes from 74.125.24.100: icmp_seq=2 ttl=39␣
↪time=137 ms
    [1524930938.787642] 64 bytes from 74.125.24.100: icmp_seq=3 ttl=39␣
↪time=137 ms
    [1524930939.787653] 64 bytes from 74.125.24.100: icmp_seq=4 ttl=39␣
↪time=136 ms
    [1524930940.788365] 64 bytes from 74.125.24.100: icmp_seq=5 ttl=39␣
↪time=136 ms

    --- google.com ping statistics ---
    5 packets transmitted, 5 received, 0% packet loss, time 4001ms
    rtt min/avg/max/mdev = 136.537/139.174/148.006/4.425 ms
    """))

print("[extract ping statistics]")
print(json.dumps(stats.as_dict(), indent=4))

print("\n[extract icmp replies]")
for icmp_reply in stats.icmp_replies:
    print(icmp_reply)
```

Output

```
[ping statistics]
{
```

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```
    "destination": "google.com",
    "packet_transmit": 5,
    "packet_receive": 5,
    "packet_loss_count": 0,
    "packet_loss_rate": 0.0,
    "rtt_min": 136.537,
    "rtt_avg": 139.174,
    "rtt_max": 148.006,
    "rtt_mdev": 4.425,
    "packet_duplicate_count": 0,
    "packet_duplicate_rate": 0.0
}

[icmp replies]
{'destination': '74.125.24.100', 'bytes': 64, 'timestamp': datetime.
↪datetime(2018, 4, 29, 0, 55, 37, 3555), 'icmp_seq': 1, 'ttl': 39, 'time
↪': 148.0, 'duplicate': False}
{'destination': '74.125.24.100', 'bytes': 64, 'timestamp': datetime.
↪datetime(2018, 4, 29, 0, 55, 37, 787175), 'icmp_seq': 2, 'ttl': 39, 'time
↪': 137.0, 'duplicate': False}
{'destination': '74.125.24.100', 'bytes': 64, 'timestamp': datetime.
↪datetime(2018, 4, 29, 0, 55, 38, 787642), 'icmp_seq': 3, 'ttl': 39, 'time
↪': 137.0, 'duplicate': False}
{'destination': '74.125.24.100', 'bytes': 64, 'timestamp': datetime.
↪datetime(2018, 4, 29, 0, 55, 39, 787653), 'icmp_seq': 4, 'ttl': 39, 'time
↪': 136.0, 'duplicate': False}
{'destination': '74.125.24.100', 'bytes': 64, 'timestamp': datetime.
↪datetime(2018, 4, 29, 0, 55, 40, 788365), 'icmp_seq': 5, 'ttl': 39, 'time
↪': 136.0, 'duplicate': False}
```

Recommended ping command execution

The following methods are recommended to execute `ping` command to get the output for parsing. These commands include an operation that changes the locale setting to English temporarily.

Linux

```
LC_ALL=C ping <host or IP address> -w <seconds> [option] > <output.file>
```

Windows

```
> chcp
Active code page: <XXX>    # get current code page

> chcp 437    # change code page to english
> ping <host or IP address> -n <ping count> > <output.file>
> chcp <XXX>    # restore code page
```

- **Reference**

- https://technet.microsoft.com/en-us/library/cc733037

CHAPTER

EIGHT

REFERENCE

8.1 Parser classes

class pingparsing.**PingParsing**(*timezone: Optional[datetime.tzinfo] = None*)

Parser class to parsing ping command output.

Parameters **timezone** (*Optional[tzinfo]*) – Time zone for parsing timestamps.

parse(*ping_message: Union[str,* pingparsing._pingtransmitter.PingResult*]*) → *pingparsing._stats.PingStats*

Parse ping command output.

Parameters **ping_message** (str or *PingResult*) – ping command output.

Returns Parsed result.

Return type *PingStats*

class pingparsing.**PingStats**(**args*, ***kwargs*)

as_dict(*include_icmp_replies: bool = False*) → Dict[str, Optional[Union[str, int, float, Sequence[Dict[str, Union[str, bool, float, int, datetime.datetime]]]]]]

ping statistics.

Returns

Return type dict

Examples

```
>>> import pingparsing
>>> parser = pingparsing.PingParsing()
>>> parser.parse(ping_result)
>>> parser.as_dict()
{
    "destination": "google.com",
    "packet_transmit": 60,
    "packet_receive": 60,
    "packet_loss_rate": 0.0,
    "packet_loss_count": 0,
    "rtt_min": 61.425,
    "rtt_avg": 99.731,
    "rtt_max": 212.597,
    "rtt_mdev": 27.566,
```

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```
    "packet_duplicate_rate": 0.0,
    "packet_duplicate_count": 0
}
```

as_tuple() → Tuple
ping statistics.

Returns

Return type namedtuple()

Examples

```
>>> import pingparsing
>>> parser = pingparsing.PingParsing()
>>> parser.parse(ping_result)
>>> parser.as_tuple()
PingResult(destination='google.com', packet_transmit=60, packet_receive=60,␣
↪packet_loss_rate=0.0, packet_loss_count=0, rtt_min=61.425, rtt_avg=99.731,␣
↪rtt_max=212.597, rtt_mdev=27.566, packet_duplicate_rate=0.0, packet_duplicate_
↪count=0)
```

property destination: str
The ping destination.

Returns

Return type str

property icmp_replies: Sequence[Dict[str, Union[str, bool, float, int, datetime.datetime]]]
ICMP packet reply information.

Returns

Return type list of dict

is_empty()

property packet_duplicate_count: Optional[int]
Number of duplicated packets.

Returns None when parsing Windows ping result.

Return type int

property packet_duplicate_rate: Optional[float]
Percentage of duplicated packets [%].

Returns None if the value is not a number.

Return type float

property packet_loss_count: Optional[int]
Number of packet losses.

Returns None if the value is not a number.

Return type int

property packet_loss_rate: Optional[float]
Percentage of packet loss [%].

Returns None if the value is not a number.

Return type float

property packet_receive: Optional[int]
Number of packets received.

Returns

Return type int

property packet_transmit: Optional[int]
Number of packets transmitted.

Returns

Return type int

property rtt_avg: Optional[float]
Average round trip time of transmitted ICMP packets [msec].

Returns

Return type float

property rtt_max: Optional[float]
Maximum round trip time of transmitted ICMP packets [msec].

Returns

Return type float

property rtt_mdev: Optional[float]
Standard deviation of transmitted ICMP packets.

Returns None when parsing Windows ping result.

Return type float

property rtt_min: Optional[float]
Minimum round trip time of transmitted ICMP packets [msec].

Returns

Return type float

8.2 Transmitter classes

class pingparsing.**PingTransmitter**
Transmitter class to send ICMP packets by using the OS built-in ping command.

count: Optional[int] = None
Number of sending ICMP packets. This attribute ignored if the value is None.

packet_size: Optional[int] = None
Specifies the number of data bytes to be sent.

ttl: Optional[int] = None
Specifies the Time to Live.

ping_option: Union[str, Sequence[str]] = ""
Additional ping command option.

interface: Optional[str] = None
Interface name or zone-id. The attribute required when *destination* is IPv6 link-local scope address.

timestamp: bool = False
[Only for Linux environment] If True, add timestamp for each ping result. Defaults to False.

auto_codepage: bool = True
[Only for Windows environment] Automatically change code page if True. Defaults to True.

property deadline: Optional[humanreadable._time.Time]
Timeout before ping exits. You can specify either a number or a string (e.g. "1sec"). If only a number is specified and a unit not found, the unit will be considered as seconds.

Unit	Available specifiers (str)
days	d/day/days
hours	h/hour/hours
minutes	m/min/mins/minute/minutes
seconds	s/sec/secs/second/seconds
milliseconds	ms/msec/msecs/millisecond/milliseconds
microseconds	us/usec/usecs/microsecond/microseconds

If both *deadline* and *count* are None, *deadline* is automatically set to the default value (3 seconds). Defaults to None.

Returns deadline

Return type humanreadable.Time

property destination: str
Hostname or IP-address (IPv4/IPv6) to sending ICMP packets.

property destination_host: str
Alias to *destination*

ping() → *pingparsing._pingtransmitter.PingResult*
Sending ICMP packets.

Returns ping command execution result.

Return type *PingResult*

Raises ValueError – If parameters not valid.

property timeout: Optional[humanreadable._time.Time]
Time to wait for a response per packet. You can specify either a number or a string (e.g. "1sec"). If only a number is specified and a unit not found, the unit will be considered as seconds.

Unit	Available specifiers (str)
days	d/day/days
hours	h/hour/hours
minutes	m/min/mins/minute/minutes
seconds	s/sec/secs/second/seconds
milliseconds	ms/msec/msecs/millisecond/milliseconds
microseconds	us/usec/usecs/microsecond/microseconds

Use system default timeout if the value is `None`. Defaults to `None`. If the system does not support timeout in milliseconds, round up as seconds.

Returns timeout

Return type humanreadable.Time

class pingparsing.**PingResult**(*stdout*, *stderr*, *returncode*)

Data class to store `ping` command execution result.

stdout: `Optional[str]`

Standard output of `ping` command execution result.

stderr: `Optional[str]`

Standard error of `ping` command execution result.

returncode: `int`

Return code of `ping` command execution result.

8.3 Errors

exception pingparsing.**ParseError**(**args*, ***kwargs*)

Bases: `Exception`

Exception raised when failed to parse ping results.

class pingparsing.error.**ParseErrorReason**(*value*)

Bases: `enum.Enum`

An enumeration.

HEADER_NOT_FOUND

EMPTY_STATISTICS

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https://github.com/thombashi/pingparsing/releases

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- GitHub repository
- Issue tracker
- pip: A tool for installing Python packages

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