
RIPE Atlas Tools (Magellan) Documentation

Release 1.0.0

The RIPE Atlas Team

November 25, 2015

1	Why This Exists	3
1.1	Requirements & Installation	3
1.2	Quickstart	5
1.3	How to Use the RIPE Atlas Toolkit	6
1.4	Troubleshooting	15

The official command-line client for RIPE Atlas.

Why This Exists

[RIPE Atlas](<https://atlas.ripe.net>) is a powerful Internet measurements platform that until recently was only accessible via the website and the RESTful API. The reality however is that a great many people using RIPE Atlas are most comfortable on the command-line, so this project is an attempt to fill that gap.

Contents:

1.1 Requirements & Installation

This is a Linux-based tool, though it should work just fine in a BSD variant. Windows is definitely not supported. In terms of the actual installation, only Python's package manager (`pip`) is currently supported, and the installation process may require some system packages to be installed in order for everything to work.

1.1.1 System Requirements

Some of the dependencies need to be compiled, so you'll need a compiler on your system, as well as the development libraries for Python. In the Linux world, this typically means a few packages need to be installed from your standard package manager, but in true Linux fashion, each distribution does things slightly differently.

The most important thing to know is that you need Python 2.7 or 3. Python 2.6 will never be supported because it's old, ugly, and needs to die.

Distribution Specific Requirements

Debian/Ubuntu

The following has been tested on Debian Jessie.

Debian-based distributions require two system packages to be installed first:

```
# apt-get install python-dev libffi-dev
```

You'll also need either `virtualenv` (recommended), or if you're not comfortable with that, at the very least, you'll need `pip`:

```
# apt-get install python-virtualenv python-pip
```

CentOS

This following has been tested on CentOS 7.

Since we require Python's `pip`, we first need to install the `epel-release` repository:

```
# yum install epel-release
```

You'll also need the following system libraries:

```
# yum install gcc libffi-devel openssl-devel
```

Once that's finished, you'll need access to `virtualenv` (recommended), or if you're not comfortable with that, at the very least, you'll need `pip`:

```
# yum install python-virtualenv python-pip
```

Gentoo

If you're a Gentoo user, you never have to worry about development libraries, but if you intend to use the bleeding-edge version of this package (and what self-respecting Gentoo user wouldn't?) then you'll probably want to make sure that `git` is built with `curl` support:

```
# USE="curl" emerge git
```

If you're not going bleeding edge, or if you're just going to use `SSH` to get the code from GitHub, then Gentoo will have everything ready for you.

Apple OSX

These instructions expect that you've got Python's `pip` installed, so if you have no idea what that is, or simply don't have it yet, you should be able to install `pip` with one easy command (as root):

```
# easy_install pip
```

Outside of that, a few of the Python dependencies require that you have a compiler on your system. For this, you need only get a free copy of `Xcode` from the app store, and from there you should be good to go.

1.1.2 Python Requirements

Importantly, Magellan requires Python 2.7 or higher. For most desktop users, this shouldn't be a problem, but for some older servers like CentOS 6 and lower, this may cause some pain. Thankfully, for most such systems, there are usually work-arounds that allow you to install a more modern version of Python in parallel.

Magellan depends on two other RIPE Atlas libraries, Cousteau and Sagan, which in turn depend on a reasonable number of Python libraries. Thankfully, Python's package manager, `pip` should handle all of these for you:

- `ripe.atlas.cousteau`
- `ripe.atlas.sagan`
- `tzlocal`
- `pyyaml`

1.1.3 Installation

From PyPi

Python's `pip` program can be used to install packages globally (not a good idea since it conflicts with your system package manager) or on a per-user basis. Typically, this is done with [virtualenv](#), but if you don't want to use that, you can always pass `--user` to the `pip` program and it'll install a user-based copy in `${HOME}/.local/`.

```
# From within a virtualenv
$ pip install ripe.atlas.tools

# In your user's local environment
$ pip install --user ripe.atlas.tools
```

Or if you want to live on the edge and perhaps try submitting a pull request of your own:

One day, we want this process to be as easy as installing any other command-line program, that is, with `apt`, `dfn`, or `emerge`, but until that day, Python's standard package manager, `pip` does the job nicely.

From GitHub

If you're feeling a little more daring and want to go bleeding-edge and use our `master` branch on GitHub, you can have `pip` install right from there::

```
$ pip install git+https://github.com/RIPE-NCC/ripe.atlas.tools.git
```

If you think you'd like to contribute back to the project, we recommend the use of `pip`'s `-e` flag, which will place the Magellan code in a directory where you can edit it, and see the results without having to go through a new install procedure every time. Simply clone the repo on GitHub and install it like so::

```
$ pip install -e git+https://github.com/your-username/ripe.atlas.tools.git
```

From a Tarball

If for some reason you want to just download the source and install it manually, you can always do that too. Simply un-tar the file and run the following in the same directory as `setup.py`:

```
$ python setup.py install
```

1.1.4 Troubleshooting

If you're using Mac OSX, the installation of Sagan, one of Magellan's dependencies may give you trouble, especially in how Apple handles PyOpenSSL on their machines. Workarounds and proper fixes for this issue can be found in the [Sagan installation documentation](#).

1.2 Quickstart

This is a very fast break down of everything you need to start using Ripe Atlas on the command line. Viewing public data is quick & easy, while creation is a little more complicated, since you need to setup your authorisation key.

1.2.1 Viewing Public Data

1. *Install* the toolkit.
2. View help with: `ripe-atlas --help`
3. View a basic report for a public measurement: `ripe-atlas report <measurement_id>`
4. View the live stream for a measurement: `ripe-atlas stream <measurement_id>`
5. Get a list of probes in ASN 3333: `ripe-atlas probes --asn 3333`
6. Get a list of measurements with the word “wikipedia” in them: `ripe-atlas measurements --search wikipedia`

1.2.2 Creating a Measurement

1. Log into [RIPE Atlas](#). If you don’t have an account, you can create one there for free.
2. Visit the [API Keys](#) page and create a new key with the permission `Create a new user defined measurement`
3. Install the toolkit as below.
4. Configure the toolkit to use your key with `ripe-atlas configure --set authorisation.create=MY_API_KEY`
5. View the help for measurement creation with `ripe-atlas measure --help`
6. Create a measurement with `ripe-atlas measure ping --target example.com`

1.2.3 Advanced Use

Refer to the [complete usage documentation](#) for more advanced options.

1.3 How to Use the RIPE Atlas Toolkit

1.3.1 Configure

For most features, Magellan will work out-of-the-box, but if you’d like to customise the experience, or if you want to use this tool to create a measurement of your own, then you’ll need to configure it.

Thankfully, configuration is easy by way of the `configure` command::

```
$ ripe-atlas configure --help
```

Options

Option	Argu-ments	Explanation
<code>--editor</code>		Invoke <code>\${EDITOR}</code> to edit the configuration directly
<code>--set</code>	<code>path=value</code>	Permanently set a configuration value so it can be used in the future.
<code>--init</code>		Create a configuration file and save it into your home directory at: <code>\${HOME}/.config/ripe-atlas-tools/rc</code>

Examples

Create a standard configuration file. Note that this typically isn't necessary:

```
$ ripe-atlas configure --init
```

Invoke your editor of choice to manually fiddle with the configuration file:

```
$ ripe-atlas configure --editor
```

Set an arbitrary value within the configuration file. You can use dot-separated notation to dictate the value you wish to change:

```
$ ripe-atlas configure --set authorisation.create=YOUR_API_KEY
```

1.3.2 Quick Measurement Information (go)

For the impatient, and for those looking to see how they might write their own plugins, we have a simple `go` command::

```
$ ripe-atlas go <measurement-id>
```

This will open a web browser and take you to the detail page for the measurement id provided.

1.3.3 Measure

The most complicated command we have, this will create a measurement (given a plethora of options) and begin streaming the results back to you in a standardised rendered form.

It's invoked by using a special positional argument that dictates the type of measurement you want to create. This also unlocks special options, specific to that type. See the [examples](#) for more information.

Options

All measurements share a base set of options.

Option	Arguments	Explanation
<code>--render</code>	One of: dns, http, ntp, ping, raw, ssl_consistency, sslcert, traceroute, traceroute_aspath, aggregate_ping	The renderer you want to use. If this isn't defined, an appropriate renderer will be selected.
<code>--dry-run</code>		Do not create the measurement, only show its definition.
<code>--auth</code>	An API key	The API key you want to use to create the measurement.
<code>--af</code>	One of: 4, 6	The address family, either 4 or 6. The default is a guess based on the target, favouring 6.
<code>--description</code>	A free-form string	The description/name of your new measurement.
<code>--target</code>	A domain or IP	The target, either a domain name or IP address. If creating a DNS measurement, the absence of this option will imply that you wish to use the probe's resolver.
<code>--no-report</code>		Don't wait for a response from the measurement, just return the URL at which you can later get information about the measurement.
<code>--interval</code>	An integer	Rather than run this measurement as a one-off (the default), create this measurement as a recurring one, with an interval of n seconds between attempted measurements. This option implies <code>--no-report</code> .
<code>--from-area</code>	One of: WW, West, North-Central, South-Central, North-East, South-East	The area from which you'd like to select your probes.
<code>--from-country</code>	A two-letter ISO country code	The country from which you'd like to select your probes.
<code>--from-prefix</code>	A prefix string	The prefix from which you'd like to select your probes.
<code>--from-asn</code>	An ASN number	The ASN from which you'd like to select your probes.
<code>--from-probe-ids</code>	A comma-separated list of probe ids	Probes you want to use in your measurement.
<code>--from-measurement</code>	A measurement id	A measurement id which you want to use as the basis for probe selection in your new measurement. This is a handy way to re-create a measurement under conditions similar to another measurement.
<code>--probes</code>	An integer	The number of probes you want to use.
<code>--include</code>	A tag name	Include only probes that are marked with this tag. Note that this option may be repeated.
<code>--exclude</code>	A tag name	Exclude probes that are marked with this tag. Note that this option may be repeated.

Ping-Specific Options

Option	Arguments	Explanation
<code>--packets</code>	An integer	The number of packets sent
<code>--size</code>	An integer	The size of packets sent
<code>--packet-interval</code>	An integer	

Traceroute-Specific Options

Option	Arguments	Explanation
--packets	An integer	The number of packets sent
--size	An integer	The size of packets sent
--protocol	One of: ICMP, UDP, TCP	The protocol used. For DNS measurements, this is limited to UDP and TCP, but traceroutes may use ICMP as well.
--timeout	An integer	The timeout per-packet
--dont-fragment		Don't Fragment the packet
--paris	An integer	Use Paris. Value must be between 0 and 64. If 0, a standard traceroute will be performed.
--first-hop	An integer	Value must be between 1 and 255.
--max-hops	An integer	Value must be between 1 and 255.
--port	An integer	Destination port, valid for TCP only.
--destination-option	An integer	IPv6 destination option header.
--hop-by-hop-option	An integer	IPv6 hop by hop option header.

DNS-Specific Options

Option	Arguments	Explanation
--query-class	One of: IN, CHAOS	The query class. The default is "IN"
--query-type	One of: A, SOA, TXT, SRV, SSHFP, TLSA, NSEC, DS, AAAA, CNAME, DNSKEY, NSEC3, PTR, HINFO, NSEC3PARAM, NS, MX, RRSIG, ANY	The query type. The default is "A"
--query-arg	A string	The DNS label to query.
--set-cd-bit		Set the DNSSEC Checking Disabled flag (RFC4035)
--set-do-bit		Set the DNSSEC OK flag (RFC3225)
--set-nsid-bit		Include an EDNS name server. ID request with the query.
--udp-payload	An integer	May be any integer between 512 and 4096 inclusive.
--set-rd-bit		Set the Recursion Desired flag.
--retry	An integer	Number of times to retry.

Examples

The simplest of measurements. Create a ping with 50 probes to example.com:

```
$ ripe-atlas measure ping --target example.com
```

The same, but don't actually create it, just show what would be done:

```
$ ripe-atlas measure ping --target example.com --dry-run
```

Be more specific about which address family you want to target:

```
$ ripe-atlas measure ping --target example.com --af 6
```

Ask for 20 probes from Canada:

```
$ ripe-atlas measure ping --target example.com --probes 20 --from-country ca
```

Or ask for 20 Canadian probes that definitely support IPv6:

```
$ ripe-atlas measure ping --target example.com --probes 20 \
  --from-country ca --include-tag system-ipv6-works
```

Rather than creating a one-off create a recurring measurement:

```
$ ripe-atlas measure ping --target example.com --interval 3600
```

Moving onto DNS measurements, do a lookup for example.com. Since we're not specifying `--target` here, this implies that we want to use the probe's resolver:

```
$ ripe-atlas measure dns --query-argument example.com
```

Getting a little more complicated, let's set a few special bits and make a more complex query:

```
$ ripe-atlas measure dns --query-type AAAA --query-argument example.com \
  --set-nsid-bit --set-rd-bit --set-do-bit --set-cd-bit
```

1.3.4 Measurements

A querying tool for finding existing measurements in the RIPE Atlas database. You can request a table-formatted list of measurements based on search-string lookups, type, start time, etc.

Options

Option	Arguments	Explanation
<code>--search</code>	A free-form string	This could match the target or description.
<code>--status</code>	One of: scheduled, stopped, ongoing	The measurement status.
<code>--af</code>	One of: 4, 6	The address family.
<code>--type</code>	One of: ping, traceroute, dns, sslcert, ntp, http	The measurement type.
<code>--field</code>	One of: status, target, url, type, id, description	The field(s) to display. Invoke multiple times for multiple fields. The default is id, type, description, and status.
<code>--ids-only</code>		Display a list of measurement ids matching your filter criteria.
<code>--limit</code>	An integer	The number of measurements to return. The number must be between 1 and 1000
<code>--started-before</code>	An ISO timestamp	Filter for measurements that started before a specific date. The format required is YYYY-MM-DDTHH:MM:SS
<code>--started-after</code>	An ISO timestamp	Filter for measurements that started after a specific date. The format required is YYYY-MM-DDTHH:MM:SS
<code>--stopped-before</code>	An ISO timestamp	Filter for measurements that stopped before a specific date. The format required is YYYY-MM-DDTHH:MM:SS
<code>--stopped-after</code>	An ISO timestamp	Filter for measurements that stopped after a specific date. The format required is YYYY-MM-DDTHH:MM:SS

Examples

Get a list of measurements:

```
$ ripe-atlas measurements
```

Filter that list by status=ongoing:

```
$ ripe-atlas measurements --status ongoing
```

Further filter it by getting measurements that conform to IPv6:

```
$ ripe-atlas measurements --status ongoing --af 6
```

Get that same list, but strip out everything but the measurement ids:

```
$ ripe-atlas measurements --status ongoing --af 6 --ids-only
```

Limit that list to 200 entries:

```
$ ripe-atlas measurements --status ongoing --af 6 --limit 200
```

Get that list, but show only the id, url and target fields:

```
$ ripe-atlas measurements --status ongoing --af 6 --field id --field url --field target
```

Filter for measurements of type dns that started after January 1, 2015:

```
$ ripe-atlas measurements --type dns --started-after 2015-01-01
```

1.3.5 Probes

Just like the `measurements` command, but for probes, and a lot more powerful. You can use this command to find probes within an ASN, prefix, or geographical region, and then aggregate by country, ASN, and/or prefix.

Options

Option	Arguments	Explanation
<code>--limit</code>	An integer	Return limited number of probes.
<code>--field</code>	One of: status, description, address_v6, address_v4, asn_v4, is_public, asn_v6, id, prefix_v4, prefix_v6, is_anchor, country, coordinates	The field(s) to display. Invoke multiple times for multiple fields. The default is id, asn_v4, asn_v6, country, and status.
<code>--aggregate-by</code>	country, asn_v4, asn_v6, prefix_v4, prefix_v6	Aggregate list of probes based on all specified aggregations. Multiple aggregations supported.
<code>--all</code>		Fetch <i>ALL</i> probes. That will give you a loooong list.
<code>--max-per-aggregation</code>	An integer	Maximum number of probes per aggregated bucket.
<code>--ids-only</code>		Print only IDs of probes. Useful to pipe it to another command.
<code>--asn</code>	An integer	Filter the list by an ASN
<code>--asn_v4</code>	An integer	Filter the list by an ASN
<code>--asn_v6</code>	An integer	Filter the list by an ASN
<code>--prefix</code>	A prefix string	Filter the list by a prefix
<code>--prefix_v4</code>	A prefix string	Filter the list by a prefix
<code>--prefix_v6</code>	A prefix string	Filter the list by a prefix
<code>--location</code>	A free-form string	The location of probes as a string i.e. 'Amsterdam'
<code>--center</code>	A pair of geographic coordinates	Location as <lat>,<lon>-string, i.e. "48.45,9.16"
<code>--radius</code>	An integer	Radius in km from specified center/point.
<code>--country</code>	A two-letter ISO country code	The country in which the probes are located.

Examples

Get a list of probes within ASN 3333:

```
$ ripe-atlas probes --asn 3333
```

Further filter that list to show only probes in ASN 3333 from the Netherlands:

```
$ ripe-atlas probes --asn 3333 --country nl
```

Change the limit from the default of 25 to 200:

```
$ ripe-atlas probes --asn 3333 --limit 200
```

Aggregate the probes by country, and then by ASN:

```
$ ripe-atlas probes --asn 3333 --aggregate-by country --aggregate-by asn
```

Show the id, url, target, description, and whether the probe is public or not:

```
$ ripe-atlas probes --asn 3333 --field id --field url --field description \
  --field is_public
```


1.3.6 Render

Sometimes you already have a large collection of measurement results and you just want Magellan to render them nicely for you. In these cases, `render` is your friend.

You can use the `--renderer` flag to target specific renderers too if the default isn't enough for you.

Options

Option	Arguments	Explanation
<code>--renderer</code>	One of: dns, http, ntp, ping, raw, ssl_consistency, sslcert, traceroute, traceroute_aspath, aggregate_ping	The renderer you want to use. If this isn't defined, an appropriate renderer will be selected.
<code>--probe-ids</code>	A comma-separated list of probe ids	Limit the results to those returned from specific probes
<code>--from-file</code>	A file path	The source of the data to be rendered. If nothing is specified, we assume "-" or, standard in (the default).
<code>--aggregate-by</code>	One of: dns, ntp, http, ping, raw, ssl_consistency, sslcert, traceroute, traceroute_aspath, aggregate_ping,	Tell the rendering engine to aggregate the results by the selected option. Note that if you opt for aggregation, no output will be generated until all results are received, and if large data sets may explode your system.

Examples

Pipe the contents of an arbitrary file `file` into the renderer. The rendering engine will be guessed from the first line of input:

```
$ cat /path/to/file/full/of/results | ripe-atlas render
```

The same, but point Magellan to a file deliberately rather than using a pipe:

```
$ ripe-atlas render --from-file /path/to/file/full/of/results
```

Specify a particular renderer:

```
$ cat /path/to/file/full/of/results | ripe-atlas render --renderer ping
```

Aggregate the output by country:

```
$ cat /path/to/file/full/of/results | ripe-atlas render --aggregate-by country
```

1.3.7 Report

A means to generate a simple text-based report based on the results from a measurement. Typically, this is used to get the latest results of a measurement in a human-readable format, but with the `--start-time` and `--stop-time` options, you can get results from any time range you like.

Options

Option	Arguments	Explanation
<code>--probe</code>	A comma-separated list of probe ids	Limit the report to only results obtained from specific probes.
<code>--renderer</code>	One of: dns, http, ntp, ping, raw, ssl_consistency, sslcert, traceroute, traceroute_aspath, aggregate_ping	The renderer you want to use. If this isn't defined, an appropriate renderer will be selected.
<code>--aggregate-by</code>	One of: status, prefix_v4, prefix_v6, country, rtt-median, asn_v4, asn_v6	Tell the rendering engine to aggregate the results by the selected option. Note that if you opt for aggregation, no output will be generated until all results are received.
<code>--start-time</code>	An ISO timestamp	The start time of the report. The format should conform to YYYY-MM-DDTHH:MM:SS
<code>--stop-time</code>	An ISO timestamp	The stop time of the report. The format should conform to YYYY-MM-DDTHH:MM:SS

Examples

Get the latest results of measurement 1001:

```
$ ripe-atlas report 1001
```

The same, but specifically request the ping renderer:

```
$ ripe-atlas report 1001 --renderer ping
```

Aggregate those results by country:

```
$ ripe-atlas report 1001 --aggregate-by country
```

Get results from the same measurement, but show all results from the first week of 2015:

```
$ ripe-atlas report 1001 --start-time 2015-01-01 --stop-time 2015-01-07
```

Get results from the first day of 2015 until right now:

```
$ ripe-atlas report 1001 --start-time 2015-01-01
```

1.3.8 Stream

Connect to the streaming API and render the results in real-time as they come in.

Options

Option	Arguments	Explanation
<code>--limit</code>	A number < 1000	The maximum number of results you want to stream. The default is to stream forever until you hit Ctrl+C.
<code>--renderer</code>	One of: dns, http, ntp, ping, raw, ssl_consistency, sslcert, traceroute, traceroute_aspath, aggregate_ping	The renderer you want to use. If this isn't defined, an appropriate renderer will be selected.

Examples

Stream the results from measurement #1001:

```
$ ripe-atlas stream 1001
```

Limit those results to 500:

```
$ ripe-atlas stream 1001 --limit 500
```

Specify a renderer:

```
$ ripe-atlas stream 1001 --renderer ping
```

Combine for fun and profit:

```
$ ripe-atlas stream 1001 --renderer ping --limit 500
```

1.4 Troubleshooting

Sometimes things don't go as planned. In these cases, this page is here to help.

1.4.1 InsecurePlatformWarning

On older systems (running Python versions <2.7.10), you may be presented with a warning message that looks like this::

```
/path/to/lib/python2.7/site-packages/requests/packages/urllib3/util/ssl_.py:100:
InsecurePlatformWarning: A true SSLContext object is not available. This
prevents urllib3 from configuring SSL appropriately and may cause certain
SSL connections to fail. For more information, see
https://urllib3.readthedocs.org/en/latest/security.html#insecureplatformwarning.
InsecurePlatformWarning
```

This is due to the insecure way older versions of Python handle secure connections and a visit to the above URL will tell you that the fix is one of three options:

- Upgrade to a modern version of Python
- Install three Python packages: `pyopenssl`, `ndg-httpsclient`, and `pyasn1`
- [Suppress the warnings](#). Don't do that though.