

RIPE NCC Measurements and Tools

Training Course

Training Services | RIPE NCC | July 2019

Schedule



09:00 - 09:30Coffee, Tea11:00 - 11:15Break13:00 - 14:00Lunch15:30 - 15:45Break17:30End

Introduction



- Name
- Number on the list
- Experience
 - RIPE Database
 - RIPEstat
 - RIPE Atlas
- Goals

Overview 1 - RIPEstat



- Introduction to RIPE and the RIPE NCC
- Introduction to RIPEstat
- More about widgets

- Exercise A: Querying for a Resource
- Visualising BGP Routing Information
 - Exercise B : BGPlay
- Reporting Abuse
- Visualising RIPE Database Data
- Personalising RIPEstat
- Comparing Networks
 - Exercise C : Kahoot

Overview 2 - RIPE Atlas



- Introduction to RIPE Atlas
- Using RIPE Atlas as a Visitor
- Looking up Public Probes
- Finding Results of Public Measurements
- Creating a Measurement
 - Demo and Exercise D
- Network Monitoring
 - Exercise E: Using Streaming API
- Command-line Interface Toolset
 - Exercise F: Using RIPE Atlas CLI
- Use Cases
- More RIPE Atlas Features
- Take Part in the Atlas Community
 - Exercise G : Kahoot

Course Goals



- RIPEstat Goals:
 - Debug your <u>own</u> networks using RIPE stat
 - Find routing information about <u>other</u> networks to enable decision making and troubleshooting

• RIPE Atlas Goals:

- Monitoring and troubleshooting your network using RIPE Atlas
- Create specific tailor-made measurements using API calls or the command line interface



Introduction to the RIPE NCC

Section 1

RIPE NCC - Who are we?





- Located in Amsterdam
- Not-for-profit organisation
- One of the five Regional Internet Registries (RIRs)
- 21,225 members (LIRs)

Our service region





What do we do?



- Distribute IPv4, IPv6, ASNs
- Training courses
- RIPE Database
- Support RIPE community
- RIPE Atlas, RIPEStat, Resource Certification

RIPE (Réseaux IP Européens)



- Started in 1989
- Discussion forum open to all parties
- Not a legal entity, no formal membership
- Develops policies
- Work done in Working Groups
- Activities on a voluntary basis
- Decisions by consensus





Introduction to RIPEstat

Section 2

What is RIPEstat?



One interface for Internet data and statistics

"One-stop shop"







stat.ripe.net

What data? What sources?



- RIPE Database
- Other RIR data
- BGP routing data (RIS)
- Active measurements (RIPE Atlas, DNSMON)
- Geolocation (third party)
- Blacklist data (third party)
- More...

Landing page



RIPEstat shows your own IP/ASN



Home | Sitemap | Contact Us | Service Announcements | Privacy Statement | Legal | Cookies | Copyright Statement | Terms of Service

Query Types



- IPv6 address/prefix
- IPv4 address/prefix
- ASN
- Hostname
- Country code

Results page



source data

Why use RIPEstat?



- For your own network:
 - Is someone else announcing my prefix?
 - How visible is my new IPv6 network?
 - Is my BGP routing consistent with the Routing Registry?
 - Are my DNS and reverse DNS consistent?
 - Location of my customers' prefixes
 - Was my prefix visible yesterday in Tokyo?

Why use RIPEstat?



- For viewing other networks:
 - How many IPv6 prefixes are announced in my country?
 - IPv6 in my country compared to neighbours
 - Who has more peers, AS1 or AS2?
 - How does the upstream outage look?
 - Is the prefix/ASN that I want already announced?
 - Which ASN announces an IP?
 - Where can I report abuse from an IP?

RIPEstat Interfaces



• Web interface

https://stat.ripe.net

• RIPEstat widget API

• RIPEstat data API



More About Widgets

Section 3

Get the data behind the widget!



Shareable results URL





- Immutable shareable URL for each result!
- URL includes:
 - widget + queried resource
 - for some widgets: **settings**, **zoom**, **time period**

Where's the data from?





source data

embed code permalink info

Content Explanation

What does this widget show? Allocation History displays information about allocations and direct assignments of prefixes or AS

numbers.

How can the visualisation be interpreted?

When the queried resource was a prefix, the graph will show how that prefix and related (more or less specific prefixes) were allocated over time. When the queried resource was an ASN, the graph will show the allocation of that ASN.

The legend will display all resources, including those which are not announced during the time range displayed. It is possible to change the displayed time period with the timeline selector underneath the graph.



The shaded area is displayed in the graph. This area can be adjusted by moving to the left or right end of the shaded area and then dragging it to the desired location. It is possible to change not only the start and end time, but also the length of the period which is shown.



What is the data source?

The RIR statistics files summarise the current state of allocations and assignments of Internet number resources. They are intended to provide a snapshot of the status of Internet number resources, without any transactional or historical details. Find details for each RIR here: AFRINIC

- APNIC
- ARIN
- LACNIC RIPE NCC

Freshness and timescale of the data 😥



- Timestamp and time period
- Different widgets = different update frequency
- Adjustable usually
 - Limits: different maximum granularities

Embed the widget!





Embedding widgets on your site



ISP embedded widgets on its page







Widgets List



https://stat.ripe.net/widget/list

RIPEstat Widgets

This is a complete list of all of the widgets that RIPEstat offers. Each of these widgets can be accessed using the links below.

When you view a widget you can also get code for embedding it in your own pages. The full procedure for embedding and configuring widgets is described in the Widget API Documentation.

Show 25 \$ entries			Search:			
Title (show slug) 🛛 🗘	Example	Prefix 0	IP address	ASN ¢	Hostname	Country ≎ code ≎
Abuse Contact Finder		~	~	~		
Address Space Hierarchy		~	*			
Address Space Usage	٩	~	~			
Allocation History	C. Sector	~	~	~		
Announced Prefixes				~		
Announced Prefixes (Inrdb)	in í			~		
Announced Prefixes (Ursa)	<u>in í</u>			~		
AS Overview				~		
AS Path Length	*			~		
AS Routing Consistency				~		
ASN Neighbours	<u>A7.5-</u>			~		
ASN Neighbours History				~		



Querying for a Resource

Exercise A

Tasks



- What network announces 140.78.50.90?
- Is 83.68.16.27 routed?
- In which country is 91.229.42.0/23 used?
- What is its corresponding inetnum object?
- What widget provides real-time routing status?
- By what percent did the number of prefixes announced within Greece increase over the last two years?
- How would you share interesting network events with a colleague?



Visualising BGP Routing Information

Section 4

Querying



- IP or ASN queried?
 - You get different widgets!

 ASN often visualised based on the prefixes it announces

RIS - Routing Information Service

- RIPE NCC collecting BGP information since 1999
 - Raw data: ris.ripe.net
- 22 route collectors
 600+ peers
- RIPEstat visualises
 RIS data





At-a-glance view: Prefix queried





At-a-glance view: ASN queried




BGPlay



See how your network is routed

- Announcements
- Withdrawals
- Path changes
- Shows routing history
 - Animated graphic
 - Highly interactive

https://stat.ripe.net/widget/bgplay



BGPlay





Prefixes visible for this ASN





Announced Prefixes: useful for ASN

Show 10 💠 entries	6	Search:	
Prefix	▼ First Seen ?		\$
193.186.176.0/22	2004-01-22 16:00:00 UTC	2014-08-13 08:00:00 UTC	:
193.186.172.0/22	2004-01-01 00:00:00 UTC	2014-08-13 08:00:00 UTC	:
193.171.8.0/24	2008-12-09 08:00:00 UTC	2008-12-11 16:00:00 UTC	
193.171.32.0/20	2008-12-09 08:00:00 UTC	2008-12-11 16:00:00 UTC	
193.171.200.0/21	2008-12-09 08:00:00 UTC	2008-12-11 16:00:00 UTC	
193.170.32.0/21	2008-12-09 08:00:00 UTC	2008-12-11 16:00:00 UTC	
140.78.0.0/16	2004-01-01 00:00:00 UTC	2014-08-13 08:00:00 UTC	;
Showing 1 to 7 of 7 ent	tries		00
Advanced Settings			
	Exclude low visibility	prefixes	
Showing results for AS12	205 from 2004-01-01 00:00:00 UTC to 2014	-08-13 08:00:00 UTC	
Results exclude	routes with very low visibility (less th	an 3 RIS peers seeing).	

History of Prefixes Announced by ASN 👧





BGPlay

Exercise B

Tasks



- Find the up-stream provider for AS1205
- Is 69.36.157.0/24 originated by only one or more ASNs?
- Check the IPv6 connectivity of your own network



Reporting Abuse

Section 5

What to do if your network is attacked?

- Spam or unauthorised access?
 - Find IP in message headers or logs
- Want to contact their admin?
 - Find the correct email for reporting abuse
- RIPE Database
 - Contact details for every ASN and IP address
 - In Europe, Middle East, Central Asia





Take action with the Abuse Contact Finder

https://stat.ripe.net/abuse

RIPEstat Abuse Contact Finder

The RIPEstat Abuse Contact Finder may be able particular IP address.	e to help you find the email address that should be	used to report network abuse ori	In -depth information about
Tou carriean more about network abuse in ge	ineral and what you can do to stop it on the KPE IN	te a Abuse information page.	abuse
	Abuse Contact Finder		
	Enter an IP address	Enter IP address	
source data		embed code permalink info 👔	

For regular RIPEstat users: this widget, of course, can also be found on the regular result page in the "Anti Abuse" tab.

Reporting Abuse



Abuse Contact Finder (2001:67c:2e8::/48)		
Email-Contact abuse@ripe.net		Email contact to report abuse
 Resource information Information for resource holders Showing results for 2001:67c:2e8::/48 as of 2017-02-03 13:52:00 UTC 		
Please note that the found contact may be unresponsive.For details please click on 'info' below.		
source data embed code permalink	info	

Reporting Abuse



Abuse Contact Finder (2001:67c:2e8::/48)	Details about the resource and abuse contact:
Email-Contact	Details
abuse@ripe.net	- Results for 2001:67c:2e8::/48 ²⁷
) Resource information) Information for resource holders	- Special Network Resource Information
Showing results for 2001:67c:2e8::/48 as of 2017-02-03 13:52:00 UTC	This resource has been identified to be related to this information: Designated to RIPE NCC on 01 July 1999 (Status: allocated; Note: n.a.)
U below.	Held by: RIPE-NCC-NET ^P
source data embed code permalink info	
	- RIR Information
	RIR RIR's Whois



Visualising RIPE Database Data

Section 6

Address Space Hierarchy Widget



- click above or below to refocus query



Historical Whois Widget

- click on another object to refocus query



	Historical Who	ls (109.110	.192.0/19) 💷		
	2016-09-15 1	16:04:48	compare		
	inetnum () 109.110.192.	0 - 109.11	show more 10.223.255		
	netname:	PL-UPC-	20091113		
	country:	PL			
	status:	ALLOCAT	ED PA		
	created:	2009-11-	23 13:25:57		
	validity:	From 201 16:04:48 To 2018-0	6-09-15)7-04 14:42:00		
	1		1		
route () 109.110.192.0/19 AS6830	open		role () UPC48-RIPE [ac	lmin-c]	open
			mntner () MNT-LGI (mnt-b	y]	open
			mntner () RIPE-NCC-HM-I	MNT [mnt-by]	open
			mntner () UPC-PL-MNT (n	nnt-lower]	open
			organisation () ORG-UTKS1-RI	PE [org]	open

Historical Whois Widget



Historical Whois (109.110.192.0/19) EETA

	2018-05-02	08:00:51 🛟	compare		
	mntner () UPC-PL-MN	s IT	how more		
	descr:	pl.upc objects maintainer	\$		
	created:	2002-05-31 0	0:05:45		
	validity:	From 2018-05 08:00:51 To 2018-07-04	-02 4 14:47:00		
	1	1	,		
domain 🕕 121.178.31.in-addr.arpa	open	role UPC	0 248-RIPE [ad	min-c]	open
domain () 151.179.31.in-addr.arpa	open	UPC	mer () C-PL-MNT (m	ntner]	open
domain () 13.222.85.in-addr.arpa	open]			
domain () 172.179.31.in-addr.arpa	open				
•					
Show all objects 1000 x domain, 403 x ineth	um, 13 x 115 x route, 14				

x role, 25 x aut-num, 4 x inet6num, 2 x asset, 4 x route6, 5 x mntner, 2 x key-cert

Historical Whois Widget



Historical Whois (AS3333)

Date and time of this update version

Contractional state - APPRIL Topology		
of this	✓ 2017-12-04 14:48:54) compare
sion 🗾	2017-02-21 10:55:57	show more
	2016-06-02 09:49:38	
	2016-04-14 10:01:24	Europeens
	2016-04-12 05:05:25	ordination
	2015-09-04 11:16:41	E NCC)
	2015-09-04 11:05:53	
	2015-05-05 04:26:20	12:58:13
	2014-10-14 22:36:58	12-04
	2014-05-27 11:51:38	04 14:50:00
	2014-01-17 12:56:58	04 14.30.00
	2014-01-17 12:54:34	1
	2014-01-17 12:49:11	
and a	2013-10-08 01:06:48	-
193.0.22.0/23IAS3333	2012-04-17 10:12:15	IPE-NCC-MN
100.0.22.0.200 00000	2012-04-17 09:55:11	
route 🕕	2012-03-12 08:40:16	intner 🚹
193.0.10.0/23 AS3333	2011-03-29 14:57:26	IPE-NCC-END
	2011-02-15 10:48:34	
route 1	2011-02-15 10:30:34	PROD DIDE (ada
193.0.12.0/23/433333	2011-02-02 14:06:10	HD-HIPE (add
route ()	2009-01-28 17:46:03	de 🕕
193.0.0.0/21 AS3333	2009-01-28 17:27:21	PS4-RIPE [tec
•	2009-01-28 11:14:33	
:	2009-01-27 15:44:05	ganisation
Show all objects	2008-12-19 18:38:35	no-nient-ni
6 x route, 1 x route6	2008-12-19 16:51:45	
	2008-11-19 16:31:45	
	2007 09 24 15:04:21	-

how more	
uropeens dination NCC)	
2:58:13 -04	
4 14:50:00	
•	
ner 🕕 E-NCC-MNT (mnt-by)	open
ner 🕕 E-NCC-END-MNT [mnt-by]	open
son ())-RIPE (admin-c)	open
(tech-c)	open
anisation () 3-RIEN1-RIPE [org]	open

Reverse DNS and DNS



- For IP prefixes: reverse DNS whois registration
- For hostnames: resolves A and AAAA records
- DNS chain for both
 - hostnames & IP addresses



Reverse DNS Consistency



how 10 🛟	entries		Search:		
Prefix 🔺	Reverse DNS 0	In RIPE Registry	○ DNS Check ○	Checked 0	
103.3.27.0/24	27.3.103.in- addr.arpa	× No	? MISSING		
93.0.0.0/21	0.0.193.in-addr.arpa	√ Yes	i INFO	2017-03-30 16:36:45	
93.0.0.0/21	1.0.193.in-addr.arpa	✓ Yes	1 INFO	2017-08-28 14:45:40	
93.0.0.0/21	2.0.193.in-addr.arpa	Yes	4 ERROR	2017-03-30 16:36:41	
93.0.0.0/21	3.0.193.in-addr.arpa	Yes	i INFO	2017-03-30 16:36:41	
93.0.0.0/21	4.0.193.in-addr.arpa	Yes	i INFO	2017-03-30 16:37:03	
93.0.0.0/21	5.0.193.in-addr.arpa	✓ Yes	i INFO	2017-03-30 16:37:04	
93.0.0.0/21	6.0.193.in-addr.arpa	Yes	i INFO	2017-03-30 16:37:03	
93.0.0.0/21	7.0.193.in-addr.arpa	Yes	i INFO	2017-03-30 16:37:07	
93.0.10.0/23	10.0.193.in- addr aroa	∨ Yes	i INFO	2017-03-30	



Reverse DNS Consistency (2)



I	NS Check (0.0.193.in-addr.arpa) פנוא	• *	
Relo	ad this widget by entering a resource her		
Choose a test result			
2017-03-30 16:36:45 INF	0	\$	
✔ All tests are okay! For o	letails see below.		
YSTEM INFO x 3			
BASIC INFO x 31			
ADDRESS INFO x 3			
CONNECTIVITY INFO x 31			
CONSISTENCY INFO x 5			
DNSSEC INFO x 11			
DELEGATION INFO x 9			
VAMESERVER INFO x 33, NOT	CE x 2		
ZONE INFO x 6, NOTICE x 3			
Request a new test			
Start Test			
ource data	embe	d code permalink info	

Reverse DNS Consistency (3)



	L.	oload this wide	at by optories	rocourco ba					
	ŀ	eload this widg	et by entering a	a resource ner					
Choose a tes	st result								
2017-03-30	16:36:41	error					÷		
Some tes	sts show err	ors! Please take	a look at the d	etails below.					
YSTEM INFO) x 3								
BASIC INFO x	15								
ADDRESS IN	NFO x 1, WAR	NING x 1							
Inc. A									
Level 0	Message		rine not has a	ID address					
MANINING	(2001:6)	7c:2e8:7::c100:2	88) without PTF	R configured.					
INFO	All Nam	eserver addres	ses are in the ro	utable public a	ddressing spac	e.			
Showing 1	to 2 of 2 er	ntries				00			
Showing 1	to 2 of 2 er	ntries				00			
Showing 1	l to 2 of 2 er	tries 4, WARNING x 3				00			
Showing 1 CONNECTIV	I to 2 of 2 er	tries 4, WARNING x 3 NOTICE x 1, WAR	NING x 1			00			
Showing 1 CONNECTIV CONSISTEN DNSSEC NOTI	I to 2 of 2 er /ITY INFO x 1 ICY INFO x 6, ICE x 2 I INFO x 9	ttries 4. WARNING x 3 NOTICE x 1, WAR	NING x 1			00			
Showing 1 CONNECTIV CONSISTEN DNSSEC NOTI DELEGATION NAMESERVEI	I to 2 of 2 er VITY INFO x 1 ICY INFO x 6, ICE x 2 I INFO x 9 R INFO x 18,	Itries 4. WARNING x 3 NOTICE x 1, WAR ERROR x 6	NING x 1			00			
Showing 1 CONNECTIV CONSISTEN DISSEC NOTI DELEGATION NAMESERVEI	I to 2 of 2 er /ITY INFO x 1 ICY INFO x 6, ICE x 2 I INFO x 9 R INFO x 18,	tries 4. WARNING x 3 NOTICE x 1. WAR ERROR x 6	NING x 1			00			
Showing 1 CONNECTIV CONSISTEN DISECTION DELEGATION NAMESERVEI Level ©	I to 2 of 2 er VITY INFO x 1 ICE x 2 I INFO x 9 R INFO x 18, Message	tries 4. WARNING x 3 NOTICE x 1. WAR ERROR x 6	NING x 1			00			
Showing 1 CONNECTIV CONSISTEN DELEGATION NAMESERVEI Level © ERROR	I to 2 of 2 er VITY INFO x 1 VITY INFO x 6, ICE x 2 I INFO x 9 R INFO x 18, Message Nameserv	4, WARNING x 3 NOTICE x 1, WAR ERROR x 6 er pike.singel.ri	NING x 1 pe.net/193.0.2.	211 is a recurse	pr.	00			
Showing 1 CONNECTIV CONSISTEN DISSEC NOTI DELEGATION NAMESERVEI Level © ERROR ERROR	I to 2 of 2 er /ITY INFO x 1 /ICY INFO x 6, ICE x 2 I INFO x 9 R INFO x 18, Message Nameserv Nameserv	4, WARNING x 3 NOTICE x 1, WAR ERROR x 6 er pike.singel.ri er pike.singel.ri	NING x 1 pe.net/193.0.2. pe.net/2001:67	211 is a recurso c:2e8:7::c100:2	or. d3 is a recursor	00			
Showing 1 CONNECTIV CONSISTEN DISSEC NOTI DELEGATION NAMESERVEI Level © ERROR ERROR ERROR	I to 2 of 2 er /ITY INFO x 1 /ICY INFO x 6, /ICE x 2 I INFO x 9 R INFO x 18, Message Nameserv Nameserv Nameserv	4, WARNING x 3 NOTICE x 1, WAR ERROR x 6 er pike.singel.ri er roike.singel.ri er rom.singel.ri	NING x 1 pe.net/193.0.2. pe.net/2001:67 pe.net/193.0.2.	211 is a recurso c:2e8:7::c100;2 136 is a recurso	or. d3 is a recursor or.	00			
Showing 1 CONNECTIV CONSISTEM DELEGATION NAMESERVEI Level © ERROR ERROR ERROR ERROR	I to 2 of 2 er /ITY INFO x 1 ICY INFO x 6 ICY INFO x 9 R INFO x 18, Message Nameserv Nameserv Nameserv Nameserv	4, WARNING x 3 NOTICE x 1, WAR ERROR x 6 er pike.singel.ri er rom.singel.ri er rom.singel.ri	NING x 1 pe.net/193.0.2. pe.net/2001:67 pe.net/193.0.2. pe.net/2001:67	211 is a recurse c:2e8:7::c100:2 136 is a recurse c:2e8:7::c100:2	or. d3 is a recursor or. 88 is a recursor	•••			
Showing 1 CONNECTIV CONSISTEM DISSEC NOTI DELEGATION NAMESERVEI ERROR ERROR ERROR ERROR ERROR	to 2 of 2 er /ITY INFO x 1 (ICY INFO x 6, ICE x 2 INFO x 9 R INFO x 18, Message Nameserv Nameserv Nameserv Nameserv	Itries 4, WARNING x 3 NOTICE x 1, WAR ERROR x 6 0 er pike.singel.ri er rom.singel.ri er rom.singel.ri er sisko.singel.i	NING x 1 pe.net/193.0.2. pe.net/2001:67 pe.net/193.0.2. pe.net/2001:67 ipe.net/193.0.2	211 is a recurse c:2e8:7::c100:2 136 is a recurse c:2e8:7::c100:2 .212 is a recurse	or. d3 is a recursor or. 88 is a recursor or.	•••			
Showing 1	I to 2 of 2 er /ITY INFO x 1 /ICY INFO x 6, /ICE x 2 I INFO x 9 R INFO x 18, Message Nameserv Nameserv Nameserv	Atries 4. WARNING x 3 NOTICE x 1, WAR ERROR x 6 er pike.singel.ri er rom.singel.ri er rom.singel.ri er rom.singel.ri er rom.singel.ri	NING x 1 pe.net/193.0.2. pe.net/2001:67 pe.net/193.0.2. pe.net/2001:67 ipe.net/193.0.2	211 is a recurs: c:2e8:7::c100:2 136 is a recurs: c:2e8:7::c100:2 .212 is a recurs	or. d3 is a recursor or. 88 is a recursor or.	•••			



Personalising RIPEstat

Section 7

Create a RIPE NCC Access Account

https://access.ripe.net

				RIPE Database (Whois)	Website
RIPE NETWORK COORDINATION CENTRE				Search the content of this	website
Manage IPs and ASNs > Analyse	>	Participate	>	Get Support	>
You are here: Home > Access					
	Email				
Sign in using your RIPE	Your ema	il address			
NCC Access account	Password				
If you don't have a RIPE NCC Access					
account, click here to create one.	Sign in			Forgot your pas	sword?
New: Two-step verification. Learn					
more					



Why personalise RIPEstat?



- Recurring lookup tasks with different widgets over multiple tabs
- Building a "history" of your lookups

Log into RIPE NCC Access Account

Ŭ	(c)		PIDE Database (Mine) Websity		••
			Search the content of this website		
	Man	nage IPs and ASNs > Analyse > F	Participate > Get Support >		
	You	u are here: Home > Access			
	S I I I I I	Sign in using your RIPE Email NCC Access account Your email address If you don't have a RIPE NCC Access account, click here to create one.	4		
		Sign in New: Two-step verification. Learn	Forgat your password		
	•	more	4	ebsite	Lo
) (site	C
\sim	f	ቻ in 🔠 🗘	Home Sitemap Contact us Service Announcements P		
Manage IPs and ASNs >	Analy	yse > Participate	> Get Support >	Publications >	About Us
You are here: Home > Analyse > S RIPEstat Home	itatistics > RIPE	Search RIPEstat			
About RIPEstat	>				
Documentation	>	Enter an IP address/prefix, ASN, country code or hostname			
Use Cases	>	Your network: AS3333, 2001:67c:2e8::/	/48	e.g.: IPv4 prefix/rang	e, IPv6, ASN
Your IP address is: 2001:67c:2e8:9::c100:14e6			0000		
System Statistics		Lost	in the ress space?	Acad for digit syndrom on macro for Part (7 Farge) Marco (7 Farge) Mar	
22,297		Find	your way with the	193.0.18.0-193.0.21.255 motives SRF-Hoto analyty Na motive (NRC-ACC-MAT and Analysia) P	
Live requests to RIPEstat (per minute)		Addu	ress Space Hierarchy	Participanti and Antonia Since	
1 301 056		widg	jet.	Andress 1 KM M2 : shut	

and the second s

MyView



- Create custom views
 - Click the "MyView" button
 - Drag and drop the widgets you want on the MyView tab
- Created under "ASN" or "IP"

MyView





Customise MyView



		R	e-order widgets as you like		
	At a Glance Routing DNS Anti Abuse Database Geographic	(4) (11) (1) (1) (5) (2)	AS Ove Hole JKU-LINZ-AS This ASN is part of 1-65535, the 16-bit ASN Blo to the RIRs according to http://www.lana.org/as Showing results for AS1205 as of 2014-08-14 08-00-0	vervlew (AS1205) Announced Iolder of this ASN: AS University Linz,AT Iock. This block contains all 16-bit ASNs, which are allocated assignments/as-numbers/as-numbers.xml . See RFC 1930	
	Activity	(2)	source data	embed	code permalink info
	Monitor-2	(1) (1) (2) (2) (2)	Routing At 2014-08-14 08:00:00 UTC, AS1205 w peers.	Status (AS1205) ras visible to 100% of 97 IPv4 and 2% of	95 IPv6 RIS full
 Rename Re-order Control v Remove 	isibility		 First ever seen as origin announcing 193.14 Originated IPv4 prefixes: 3 Originated IPv6 prefixes: 0 Observed BGP neighbours: 2 Address space announced (IPv4): 67584 IPs Address space announced (IPv6): equiv. to 0 a Advanced Settings Showing results for AS1205 as of 2014-08-14 08:00:0 Results exclude routes with very low visit 	86.172.0/22, on 2004-01-03 00:00:00 UT /48s /0 UTC bility (less than 3 RIS peers seeing).	с.

Visibility of MyView



- MyView is only accessible after you have queried an ASN or IP
- A MyView created after an ASN query is only visible for other ASN queries
- A MyView created after IP query is only visible for other IP queries
- This can be changed via settings

Controlling Visibility



MyView Summary



- RIPE NCC Access login required
- Customised selection of widgets
- It's like an extra tab, specifically for your queries
- By default, available for one type of resource (ASN or IP)
- Can't be shared



Comparing Networks

Section 8

Why compare networks?



- Want to peer with AS-X?
 - Learn by opening multiple widgets about AS-X
- Choosing upstream ?
 - Compare AS-X with AS-Y by opening same widget loaded with two different ASNs
- Internet outage in a country?
 - Open multiple country-related widgets in same view

How to compare



• Compare results in different widgets



Compare results




Compare results



Compare Results

Select up to six different widgets from the list to compare at one time. Different resources can be queried for each widget.



Compare resources summary



- No login required
- Add widgets AND input query for each widget (ASN, IP, etc.)
- It is a result page with widgets and query results
- Share it via a permalink

Comparing countries in one widget



- Compare growth of ASNs in DE and NL
- See IPv6 adoption rate in four countries at the same time
- Analyse IP hijacking with 'BGP Update Activity Widget'
- Use "multi-resource" button in "Country Routing" widget

In-widget comparison



Country Routing Statistics





kahoot

Exercise C



Questions





RIPE Atlas

Overview 2 - RIPE Atlas



- Introduction to RIPE Atlas
- Using RIPE Atlas as a Visitor
- Looking up Public Probes
- Finding Results of Public Measurements
- Creating a Measurement
 - Demo and Exercise D
- Network Monitoring
 - Exercise E: Using Streaming API
- Command-line Interface Toolset
 - Exercise F: Using RIPE Atlas CLI
- Use Cases
- More RIPE Atlas Features
- Take Part in the Atlas Community

RIPE Atlas Global Coverage







Introduction to RIPE Atlas

Section 9

Goals



- Monitoring and troubleshooting your network using RIPE Atlas
- Create specific tailor-made measurements using API calls or the command line interface

Prerequisites



- We assume you have already used RIPE Atlas
- Do you have a RIPE NCC Access account?
 - If not quickly create one: access.ripe.net
- Do you have credits to spend?
 - You get a voucher from us

An Introduction



- RIPE Atlas is a global active measurements platform
- Goal: view Internet reachability
- Probes hosted by volunteers
- Data publicly available

atlas.ripe.net

RIPE Atlas measurements



- Built-in global measurements towards root nameservers
 - Visualised as Internet traffic maps
- Built-in regional measurements towards "anchors"
- Users can run customised measurements
 - ping, traceroute, DNS, SSL/TLS, NTP and HTTP

Probes and Anchors





- 10,300+ probes connected (427 RIPE Atlas Anchors)
- 7,900+ results collected per second
- 21,000+ measurements currently running



RIPE Atlas Overview (2)



RIPE Atlas Global Coverage





Most Popular Features



- Six types of measurements: ping, traceroute, DNS, SSL/TLS, NTP and HTTP (to anchors)
- APIs and CLI tools to start measurements and get results
- Streaming data for real-time results
- New: "<u>Time Travel</u>", <u>LatencyMON</u>, <u>DomainMON</u>, <u>Tracemon</u>
- Status checks (Icinga & Nagios)



Using RIPE Atlas As a Visitor

Section 10

Internet Traffic Maps



RIPE Atlas	«
About RIPE Atlas	>
Get Involved	>
Probes and Anchors	>
Measurements, Maps and Tools	~
Measurements	
Internet Maps	
Tools	
Resources	>
RIPE NCC Members	
My Atlas	>
Staff Pages	>

Internet Maps



Shows, for each probe, which root DNS server instance the probe ends up querying, when they ask a particular root server. In other words, it shows the "gravitational radius" for root DNS server instances.

RTT to Fixed Destinations



Shows the colour coding for the RTT value for the particular destination for each probe. The minimum / average / maximum values are based on standard "ping" measurements.

Comparative DNS Root RTT



Shows a comparison of response time for DNS SOA queries to all the root DNS servers. For each probe, a marker shows the "best" root server with colour identifying the related minimum response time.

Reachability of Fixed Destinations



Shows if the particular fixed destination is reachable or not from each probe. Red markers indicate that the specific destination for these probes are unreachable and green reachable.

Root Server Performance



This map shows the reply time to the SOA query of a particular root DNS server, over the selected transport protocol (UDP, TCP or comparison of the two) for each probe.

Where is **B-root**?



We display measurement results from the last hour only.



Probes per ASN (in RIPEstat)





Where we want to place probes







Looking Up Public Probes

Section 11

Searching for probes



	IPE I	NCC NATION CENTRE			RIPE Database (Whois) Search IP Address or ASN	Website		Filter based on
anage IPs	and ASNs >	Ana	alyse	Participate >	Get Support	> Publicatio	ns > Ab	ASN, country,
You are	here: Home > A	nalyse > Interne	et Measurements	> RIPE Atlas > Probes				location
- Probe	es							
his is a list	of all current I	RIPE Atlas prob	bes, including inf	formation specific to each prob	e. More probes are contin	Jally continue.		
 Learn me See the p Apply for 	ore about prot probes map r your own pro	be		Filter by id/asn/country/des	scription Any Status	• IPv4/v6 •	Any Country •	×
Public	Login to see	more						
Id	ASN v4	ASN v6	Country	Description		Con	nection Status	
6175	1103	1103		SURFnet bv		6 4	weeks	•
6146	60781	60781	-	Leaseweb Network B.V.		a 4	weeks	-
6152	28753	28753		Leaseweb Network B.V.		6 4	weeks	•
6137	3333	3333	=	nl-ams-as3333-preprod		Δ 4	weeks	•
6147	33280	33280		Afilias		a 4	weeks	₽
6112	197216	197216		Delta Softmedia Ltd		a 4	weeks	-
6161	27843	27843		Optical Technologies		a 4	weeks	-
6142	63403	63403		Afilias		a 4	weeks	-
6008	2607	2607		AA sk-bts-as2607		۵.4	weeks	-
6001	3333	3333	=	AA nl-ams-as3333		a 4	weeks	-

Probe page

» You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Probes > Probe #10010

Probe #10010 (Register)



3 days, 9 hours

Zoomable Ping Graph



- Replace multiple RRD graphs: zoom in/out in time, in the same graph
- Easier visualisation of an event's details
- Selection of RTT class (max, min, average)





Finding Results of Public Measurements

Section 12

Looking up Measurements Results



https://atlas.ripe.net/measurements/

Manage IPs	and AS	SNs >	Anal	yse	>	Partici	pate	> Ge	t Support	>	Publica	tions	>	About	Us
You are here: Home > Analyse > Internet Measurements > RIPE Atlas > Measurements Measurements															
		Search	by target	\$ Search					Any Status	¢ IPv4/v6	\$ AI	l types	Of all time	\$	т×
Ping	Trac	ceroute	DNS	HTTP	SSL	NTP	WiFi	Built-in	Anchoring						
ID	Туре	Target				Description	n				Probes	Interval	Time (UTC)	•	Status
9278562	Ping	www.ripe	e.net			Ping measu	irement to	www.ripe.net			8	one-off	08-09-2017 Never	14:02	0
9278557	Ping	185.15.24	45.163			From script	for latency	/ checks for M	onitoring		35	one-off	08-09-2017 Never	13:58	0
9278556	Ping	123.126.2	20.54			check unico	om				10	one-off	08-09-2017 08-09-2017	13:51 14:00	
9278555	Ping	r1.d1.de.	recast-it.net			From script	for latency	r checks for M	onitoring		35	one-off	08-09-2017 08-09-2017	13:50 14:00	
9278554	Ping	r1.a1.nl.r	ecast-it.net			From script	for latency	/ checks for M	onitoring		35	one-off	08-09-2017 08-09-2017	13:50 14:00	
9278553	Ping	2001:6a8	:28c0:2017::0	00:00:FF		Ping 6 BLU	E measurer	ment to 2001:6	5a8:28c0:2017:	:00:00:FF	956	one-off	08-09-2017 08-09-2017	13:49 13:55	
9278550	Ping	2001:6a8	:28c0:2017::0	00:00:FF		Ping6 meas	surement to	o 2001:6a8:28	:0:2017::00:00:	FF	484	one-off	08-09-2017 08-09-2017	13:42 13:50	

Available visualisations: ping



 List of probes: sortable by RTT

 Map: colour-coded by RTT

 LatencyMON: compare multiple latency trends





Available visualisations: traceroute

 <u>TraceMON</u>: network topology, latency and nodes information

 <u>IPMap(beta)</u>: hops geolocation on map (prototype)





Available visualisations: DNS



• Map, colour-coded response time or diversity



• List of probes, sortable by response time

DNS measurement to ns1.opteamax.de											
General Information Probes Map Download Results Modification Log											
Probe	+ ASN (v4)	¢ AS	SN (v6)	¢	¢	÷	Time	+ Name	Response Time		
17840	6327				٠	۵	2015-05-19 09:38	null		362.009	
18035	43030					۵	2015-05-19 09:50	null		347.39	
18129	327805				>=	۵	2015-05-19 09:49	null	207.7	43	
15844	32098					۵	2015-05-19 09:48	null	184.237		
17857	852				÷	۵	2015-05-19 09:37	null	177.694		
19894	6327				÷	۵	2015-05-19 09:36	null	168.689		
19204	21513				٠	۵	2015-05-19 09:50	null	141.199		
15922	30036					6	2015-05-19 09:47	null	133.309		

Downloading Measurements Results

- Click on "Results", then "Download"
- Or URL
- Or API
- Results in JSON
- Libraries for parsing on GitHub

% Calibration for anchoring measurement: IPv6 Traceroute for ke-nbo-as37578.anchors.atlas.ripe.net												
General Informatio	n	Probes	Мар	OpenIPMap Pr	ototype	Results						
Download the raw measurement result data here.												
You can use this form to download the data through your browser, or use the preview on the right to help you query the REST API directly.												
Select Your Timeframe URL Preview												
Start Date*:	Start 2017-09-13 (start time of this measuremer + https://atlas.ripe.net/api/v2/measuremen											
	-136526666663(6)-136554715541											
Stop Date*:	2017	-09-13 (start tin	ne of this me	asuremer 🛊								
Date*: All dates are end-of-day												
Format:	Format: ISON \$											
Download												

Search for Measurements by Target in RIPEstat



Finding one specific measurement

- If you know the measurement ID:
 - https://atlas.ripe.net/measurements/ID
 - https://atlas.ripe.net/measurements/2340408/
Use Existing Measurements



- Many measurements already running!
- Search for existing public measurements first...
- Only then schedule your own measurement



Creating a Measurement

Section 13

Benefits of your own measurements

- Customer problem: cannot reach your server
 - Schedule measurements (pings or traceroutes) from up to 1,000 RIPE Atlas probes worldwide to check where the problem is
- Measuring packet loss on suspected "bad" link
- Testing anycast deployment

Prerequisites



- RIPE NCC Access account ?
 - If not, create one: ripe.net/register

- Do you have credits to spend?
 - Redeem voucher
- Redeem LIR credits monthly

Logging In



- Log in to <u>atlas.ripe.net</u>
 - Use your RIPE NCC Access account
 - Same account for LIR Portal, RIPE Atlas, RIPEstat, RIPE Labs...
 - Create an account if you don't already have one



Credits system



- Measurements cost credits
 - ping = 10 credits, traceroute = 20, etc.
- Why? Fairness and to avoid overload
- Spending limit and max number of measurements

How can you earn credits?



- Hosting a RIPE Atlas probe
- Being a RIPE NCC member
- Hosting an anchor
- Sponsoring probes
- Being an ambassador
- Redeeming a voucher

Credits overview



				Website		mencia dulunce -	
			Search the content of this	s website			
	CENTRE		Search the content of this	, website			
Manage IPs and ASNs >	Analyse >	Participate	> Get Support	> Public	ations >	About Us	
You are here: Home > Analyse > Inte	ernet Measurements > RIPE At	las > My Atlas > My Credits					
RIPE Atlas	« Credit	5		1 50	000	-61	
About RIPE Atlas		-	lituse and current	153	,033	,501	
Get Involved	> consumption,	transfer credits to someon	e else, and redeem a		9,000,00	credits / hour	
Probes and Anchors	> voucher for cr	redits if you have one.			5,000.00	creates / nour	
Measurements, Maps and Tools	>						
Resources	> Initial History	Lill Charts & Archives	≓ Transfer ≓ Standi	ing Order 🛛 🛷 Rec	leem voucher		
RIPE NCC Members			F 1 of 26	> >>			
My Atlas	~						
Credits		Comm	Give credit	•	Change	Balance	
API Keys		Prob	to someone		+ 108,000	153,033,561	
Messages	My Atlas > Cr	redits Probe			+ 108,000	152,925,561	
Anchors		Probe	ID:6019 Anchor uptime 5x ex	xtra credit	+ 108,000	152,817,561	
Settings		LOTC Probe	D:6019 Anchor host 5x extra	a credit	+ 108,000	152,709,561	
Staff Pages	> 2016-02-02 0	1:02 UTC Probe	ID:6019 Anchor uptime 5x ex	xtra credit	+ 108,000	152,601,561	
	2016-02-02 0	1:02 UTC Probe	D:6019 Anchor host 5x extra	a credit	+ 108,000	152,493,561	
	2016-02-01 0	1:02 UTC Probe	D:6019 Anchor uptime 5x ex	xtra credit	+ 108,000	152,385,561	
	2016-02-01 0	1:02 UTC Probe	D:6019 Anchor host 5x extra	a credit	+ 108,000	152,277,561	

Scheduling a measurement



- Log in to atlas.ripe.net
- Four methods:
 - 1.Quick and easy
 - 2. Advanced GUI usage
 - 3. API (curl and JSON code)
 - 4. CLI

1. Quick and easy



Ping measurement to bbc.co.uk	Description	× Daily Cost: 10
larger:	Description:	You will run o
An IP address or hostname	Ping measurement to bbc.co.uk	in about 1
	Interval:	
Address Family*:	240	•
IPv4 ‡	How often this should be done (second	ds ories by
Packets:	Ignored for one-off measurement	ts.
3	Deselve en Dreher	Total Exp
Size	Force the probe to do DNS resolution	on
48		Users who v
		credits for t
		creates for a
Advanced Options + Ping + Traceroute + E Step 2 Probe Selection	DNS +SSL +HTTP +NTP	ferenc@ripe.n
> Advanced Options + Ping + Traceroute + D Step 2 Probe Selection Worldwide 10 × + New Set - wizard +New Set - manual	DNS + SSL + HTTP + NTP + IDs List + Reuse a set from a measurement	ent
> Advanced Options + Ping + Traceroute + D Step 2 Probe Selection Worldwide 10 × + New Set - wizard +New Set - manual Step 3 Timing	>NS + SSL + HTTP + NTP + IDs List + Reuse a set from a measurement	ferenc@ripe.r
> Advanced Options + Ping + Traceroute + D step 2 Probe Selection Worldwide 10 × + New Set - wizard +New Set - manual step 3 Timing This is a One-off: □ -	DNS + SSL + HTTP + NTP + IDs List + Reuse a set from a measurement	ent
> Advanced Options + Ping + Traceroute + D Step 2 Probe Selection Worldwide 10 × + New Set - wizard + New Set - manual Step 3 Timing This is a One-off: Start time (UTC):	DNS + SSL + HTTP + NTP + IDs List + Reuse a set from a measurement Stop time (UTC):	ent

2. Use GUI to schedule a measurement 😥

- Mostly used for a periodic, long-term measurement
 - Or "One-off"
- Choose type, target, frequency, start/end time, # of probes, region...
- Each measurement will have **unique ID**
- "API Compatible Specification" is generated too

2. Advanced GUI



	Step 1 Definitions		Costs summary
	Ping measurement to bbc.co.u	k 🗶	Daily cost: 10800 credits
	Target:	Description:	You will run out of credits
	bbc.co.uk	Ping measurement to bbc.co.uk	in about 124 days
(B)	An IP address or hos	tname Interval:	
	Address Family*:	240	
	IPv4	How often this should be done (seconds	- 191 - 9101 - 9101
	Packets:	between samples). Note that this value is	2017 1/2017
	3	Ignored for one-off measurements.	Balance
		Resolve on Probe:	Total Expenses
	Size:	Force the probe to do DNS resolution	
	48	0	Users who will supply
			measurement:
	> Advanced Options		ferenc@ripe.net 🛊
E	Step 2 Probe Selection Worldwide 10	×	
F	+ New Set - wizard +New Set - mar Step 3 Timing This is a One-off:	hual + IDs List + Reuse a set from a measurement	
	Start time (UTC):	Stop time (UTC):	
	As soon as possible	Never III	
	> Measurement API Compa	atible Specification	
	G	e My Measurement(s)	

3: Use API to schedule a measurement 😥

- Using command-line and scripting: Application Programming Interface (API)
 - https://atlas.ripe.net/docs/api/v2/manual/measurements/ types/
 - https://atlas.ripe.net/keys/

- You will need API keys
 - To create measurements without logging in
 - To securely share your measurement data

3. API Compatible

C



Create a New Measurement

 Ping measurement to bbc. 	co.uk		×	Daily cost: 10800 (
Target:		Description:		You will run out of
bbc.co.uk		Ping measurement to bbc.co.uk		in about 124 d
An IP address or	hostname	Later sele		
Address Family*:		Interval:		
IDv4		240	0	
11. Art	•	HOW OTTEN THIS Should be done (seconds svalue is	JONEZ 021015
Packets:		ignored for one-off measu	rements.	Balance
3	\$			Total Exposed
<u>.</u>		Resolve on Probe:		Total Expenses
Size:		Force the probe to do DNS re	solution	
48	\$			Users who will s
				credits for this
Advanced Options				ferenc@ripe.net
Advanced Options + Ping + Traceroo	ute + DNS	+ SSL + HTTP + NTP		ferenc@ripe.net
 > Advanced Options + Ping + Tracerou Step 2 Probe Selection Worldwide 10 + New Set - wizard + New Set Step 3 Timing This is a One-off: Start time (UTC): As soon as possible 	ute + DNS	+ IDs List + Reuse a set from a mean Stop time (UTC):	surement	ferenc@ripe.net
 Advanced Options + Ping + Tracerou Step 2 Probe Selection Worldwide 10 + New Set - wizard + New Set Step 3 Timing This is a One-off: Start time (UTC): As soon as possible 	ute + DNS × • manual +	+ IDs List + Reuse a set from a mean Stop time (UTC): Never	surement	ferenc@ripe.net
 Advanced Options + Ping + Tracerou Step 2 Probe Selection Worldwide 10 + New Set - wizard + New Set Step 3 Timing This is a One-off: Start time (UTC): As soon as possible 	ute + DNS	+ IDs List + Reuse a set from a mean Stop time (UTC): Never	surement	ferenc@ripe.net
 > Advanced Options + Ping + Tracerou Step 2 Probe Selection Worldwide 10 + New Set - wizard + New Set Step 3 Timing This is a One-off: Start time (UTC): As soon as possible > Measurement API Core 	ute + DNS	+ IDs List + Reuse a set from a mean Stop time (UTC): Never	surement	ferenc@ripe.net

[cont...] 3. API Compatible



curldump-head	lerH "Content-Type	e: application/j	son" -H "Accept:	
application/json"	-X POST -d '{			
"definitions": [
{				
"target": "nrc.nl	" '			
"af": 4,				
"packets": 3,				
"size": 48,				
"description": "F	Ping measurement to	o nrc.nl",		
"interval": 240,				
"resolve_on_pro	be": false,			
"skip_dns_checl	k": false,			
"type": "pipg"				

Create API Key



- Go to MyAtlas
- Click on "Create an API Key"
- Choose "permission": "schedule new measurement"
- Careful! Time is UTC!
- Give it a label



DEMO

Create a Measurement (GUI) Explore advanced parameters



Create a Measurement

Exercise D

Exercise



- Create a ping measurement:
 - Involving ten probes
 - To a target of your choice
 - Source is your country
 - Duration of two days

Tasks



- 1. Warm-up: Create a measurement using the GUI
- 2. Create API Key
- 3. Schedule a measurement using the API

Task 1: Use web interface



- Useful hint: once you generate a measurement, copy "API Compatible Specification" to text file
- Take note of the measurement ID!

	CENTRE		RIPE Database (W Search IP Address	hois) Website or ASN		٩
Manage IPs and ASNs >	Analyse	> Participate	> Get Suppo	ort > Pu	blications >	About Us
RIPE Atlas About RIPE Atlas Get Involved Probes and Anchors Measurements, Maps and Tools Measurements Internet Maps Tools	> Measurer	ments > RIPE Atlas > Measurements Filter by target and/or description Built-ins	A	ny Status 🕴 🗍 IPv4/v6	+ Cre ¢ All types ¢ Of all	ate a Measurement time 🕴 🝸 🗙
Resources RIPE NCC Members My Atlas #4 3057002	Descri Ping n Specif 2 mor Ping n Specif 2 mor	iption neasurement to nu.nl ic Probes > nu.nl tiths ago - 2 months ago neasurement to nu.nl ic Probes > nu.nl ths ago - 2 months ago		Probes 100 100	Status	*

reate a Nev	v Measure	ment					
Step 1 Definition	S						
Please select the type of measurement you want to create							
+ Pi	ng + Traceroute	+ DNS + S	SL + NTP				
Step 2 Probe Se	lection						
Worldwide	50 ×						
+ New Set - wizard	+New Set - manual	+ IDs List +	Reuse a set from a me	asurement			
Step 3 Timing							
This is a One-off: Start time: As soon as possible	II	Stop time:					
> Measurement	API Compatible	Specification					
	Create My M	/leasurement(s)					

Task 2: Create API key



1. Click on "Create an API Key"

- 2. Permission: "schedule a new measurement"
- 3. "Target" is not applicable (N/A) for this type

You are here: Home > Analyse > Inte	ernet Meas	surements > RIPE Atlas							
RIPE Atlas	«								
About RIPE Atlas	>	ADI Kovs					+0	reate ar	n API kev
Get Involved	>	AFIREys							
Probes and Anchors	>								
Measurements, Maps and Tools	>	C Key	Created	- Permission	Object	Label	Valid	Valid	Enabled
Resources	>						From	То	
RIPE NCC Members		 1967424c-0947-48ab-a990- b35b42b3e921 	2016-02-04 15:56 UTC	Create a new user defined measurement	(N/A)	ciao			~
My Atlas	~	D 1b2fd786-4059-4505-876d-	2015-08-27	Create a new user defined	(N/A)	Michy			~
Credits		c11880106cc7	11:53 UTC	measurement		Test			
API Keys									
Messages				Showing 2 keys					

[cont...] Task 2: Create API key



1. Give it a label

- 2. Give it a duration of validity (leave empty for defaults)
- 3. "Key" value to be passed on to the API call (next step)

Task 3: Use API



Schedule a measurement using API

- Use the "key" you just generated
- Hint: copy and past API call syntax from the measurement generated by the GUI

• Example:

curl -H "Content-Type: application/json" -H "Accept: application/json" -X
POST -d '{ "definitions": [{ "target": "ping.xs4all.nl", "description":
 "My First API Measurement", "type": "ping", "af": 4 }], "probes":
 [{ "requested": 10, "type": "country", "value": "RS" }] }' <u>https://
 atlas.ripe.net/api/v1/measurement/?key=YOUR_API_KEY</u>

Сору

Measurement API Compatible Specification

curl --dump-header - -H "Content-Type: application/json" -H "Accept: application/json" -X POST -d '{ "definitions": [{ "target": "nrc.nl", "af": 4,

"packets": 3,

"size": 48,

"description": "Ping measurement to nrc.nl",

"interval": 240,

"resolve_on_probe": false,

"skip_dns_check": false,

"type": "ning"

Copy to clipboard

|--|

Terminal Shell Edit View Window Help	0 b/s 🚯 🖸	🖕 🎅 🗘 💈	₿ ┥ 💽 100%	🔹 wo 12:
● ● ●				R _M
air-becha:~ becha\$ curl -H "Content-Type: applicat	:ion/j	son" -	H "Acce	ept:
application/json" -X POST -d '{ "definitions": [{	"tar	get":	<pre>"ping.></pre>	(s4al
l.nl", "description": "My First Measurement", "typ	e": "	'ping",	"af":	4 }
], "probes": [{ "requested": 10, "type": "country	′", "∖	/alue":	"RS" }	·] }
<pre>' https://atlas.ripe.net/api/v1/measurement/?key=7 -fbf1a007d060</pre>	'b4c34	41-450)4-4d83-	9ed7
{"measurements":[2421551]}air-becha:~ becha\$				
x1A3P2X/X9CU/BggXXLyydxCrMUFeBUX4W2FRX/Do3Ovs8FWXHOF1Gv7oV0nXTxm eMA9VDxsYvgrONvIpBH/HKsuMBH716LxXb53Q4MUZgVXnCrxHZu+B52NBQfTNFuy MonomouNnth-3BYarBathTadur/KeaBaCACattal/TBeTuKethathr/VVDFRM/sab/catt				



Network Monitoring

Section 14

Network Monitoring



- Integrate "status checks" with existing monitoring tools (Icinga, Nagios)
- Using real-time data streaming
 - Server monitoring
 - Detecting and visualising outages

Steps for integration



- 1. Create a RIPE Atlas ping measurement
- 2. Go to "status checks" URL (RESTful API call)
 - https://atlas.ripe.net/api/v2/measurements/2340408/ status-check?max_packet_loss=20
- 3. Documentation:
 - https://atlas.ripe.net/docs/api/v2/manual/measurements/ status-checks.html
- 4. Add your alerts in Nagios or Icinga



RIPE Atlas streaming



- Allows users to receive the measurement results as soon as they are sent by the probes in real time
 - Publish/subscribe through web sockets
- There are three types of data:
 - Measurement results
 - Probe connection status events
 - Measurements metadata

RIPE Atlas streaming



- Visualising network outages
 - http://sg-pub.ripe.net/demo-area/atlas-stream/conn/
- Real-time server and performance monitoring
- Filtering and reusing measurement results
- Documentation:
 - https://atlas.ripe.net/docs/result-streaming/



Using streaming API

Exercise E

Preparation for the exercise



- Preconfigure web browser
- In Safari
 - Preferences > Advanced>Show Develop menu
- Chrome or Firefox needs no reconfiguration

EX1: Monitoring server reachability



- Scenario: customers complain it takes a long time to reach your server
- Action: ping your server from 50 probes
 - Choose acceptable latency threshold
 - Notice and react when you start receiving samples
- Task: Use the ping measurement ID 19230504
 - Choose which threshold (e.g. greater than 30ms)
 - Impose threshold on "min" (the minimum result of the three ping attempts)

Steps



- 1. http://atlas.ripe.net/webinar/streaming01.html
- 2. Open the development console
- 3. Wait for results to arrive
- 4. Save the HTML file locally and edit the code
- 5.Open the edited html file in a browser and view results

Page Source




Streaming results before editing



Elements	(1) Network	J Timelines	Debugger	Storage	Canvas
			Q,		< > Preserve Log
E ► I received - {af	: 4, prb_id: 1976	7, result: [{rtt:	89.11834}, {rtt: 80	5 .919135 }, {rtt:	85.250185}],}
E ► I received - {af	: 4, prb_id: 5008	0, result: [{rtt:	171.035625}, {rtt:	170.931583}, {rt	t: 170.712583}],}
E ► I received - {af	: 4, prb_id: 1127	0, result: [{rtt:	56.730195}, {rtt: !	56.99866}, {rtt:	57 .10254 }],}
E ► I received - {af	: 4, prb_id: 1181	9, result: [{r / t:	27.58189}, {rtt: 20	6.48163}, {rtt: 2	6.31239}],}
E ► I received - {af	: 4, prb_id: 1125	4, result: [{ <mark>r</mark> tt:	25.91282}, {rtt: 2	5.951535}, {rtt:	25.85539}],}
E ► I received - {af	: 4, prb_id: 1125	4, result: [{ <mark>r</mark> tt:	25.878045}, {rtt: 2	25.884435}, {rtt:	25.899845 }],}
E ► I received - {af	: 4, prb_id: 1125	4, result: [{rtt:	26.17654}, {rtt: 2	5.92677}, {rtt: 2	5.80457}],}
E ► I received - {af	: 4, prb_id: 3437	9, result: [{rtt:	46.6846}, {rtt: 46	.188255}, {rtt: 4	6.266295}],}
E ► I received - {af	: 4, prb_id: 3437	9, result: [{rtt:	46.639365}, {rtt:	46.337135}, {rtt:	46.329865 }],}
E ► I received - {af	: 4, prb_id: 3253	7, result: [{rtt:	31.569225}, {rtt: 3	31.04494}, {rtt:	31.345645}],}
E ► I received - {af	: 4, prb_id: 3253	7, result: [{rtt:	31.36033}, {rtt: 3	1.311695}, {rtt:	31.08219}],}
E ► I received - {af	: 4, prb_id: 5013	9, result: [{rtt:	174.899542}, {rtt:	175.433042}, {rt	t: 176.889375}],}
E ► I received - {af	: 4, prb_id: 5013	9, result: [{rtt:	175.135042}, {rtt:	179.360667}, {rt	t: 174.592625}],}
E ► I received - {af	: 4, prb id: 5004	9, result: [{rtt:	19.526792}, {rtt: 1	18.990375}, {rtt:	18.938875}],}

From the doc



Common parameters (in addition to stream_type)						
Name	Description					
prb	A specific probe ID. If you don't set this parameter, you will receive results from all the probes					
acceptedFields	A list of accepted fields name, the messages will be pruned server side. If you don't set this parameter you will receive all the fields					
enrichProbes	If you want to enrich the information received with the "probestatus" stream about the probes (e.g. lat, long), set this option to true					
equalsTo	Allows to filter by values. E.g. with {status: "connected", asn: "3333 4444"} you will receive all the messages with a connected status and ASn equals to 3333 or 4444					
lessThan	Allows to filter by values. E.g. with {valueX: 15} you will receive all the messages with a valueX less than 15					
greaterThan	Allows to filter by values. E.g. with {valueX: 15} you will receive all the messages with a valueX greater than 15					
Parameters for "result" stream_type						
Name	Description					
msm	A specific measurement ID					
type						
	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl					
sourceAddress	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address					
sourceAddress sourcePrefix	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address Streams all the results coming from a probe having an address in the specified prefix					
sourceAddress sourcePrefix destinationAddress	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address Streams all the results coming from a probe having an address in the specified prefix Streams all the results measuring the specified address					
sourceAddress sourcePrefix destinationAddress destinationPrefix	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address Streams all the results coming from a probe having an address in the specified prefix Streams all the results measuring the specified address Streams all the results measuring an address in the specified prefix Streams all the results measuring an address in the specified prefix					
sourceAddress sourcePrefix destinationAddress destinationPrefix passThroughHost	 Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address Streams all the results coming from a probe having an address in the specified prefix Streams all the results measuring the specified address Streams all the results measuring an address in the specified prefix Streams all the results measuring an address in the specified prefix Streams all the results measuring an address in the specified prefix Streams all the traceroutes passing through the specified host. Only for traceroute measurements. 					
sourceAddress sourcePrefix destinationAddress destinationPrefix passThroughHost passThroughPrefix	Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address Streams all the results coming from a probe having an address in the specified prefix Streams all the results measuring the specified address Streams all the results measuring an address in the specified prefix Streams all the results measuring an address in the specified prefix Streams all the traceroutes passing through the specified host. Only for traceroute measurements. Streams all the traceroutes passing through a host in the specified prefix. Only for traceroute measurements.					
sourceAddress sourcePrefix destinationAddress destinationPrefix passThroughHost passThroughPrefix sendBacklog	 Streams all the results of the specified type, i.g. ping, traceroute, ntp, http, dns, ssl Streams all the results coming from a probe having the specified address Streams all the results coming from a probe having an address in the specified prefix Streams all the results measuring the specified address Streams all the results measuring an address in the specified prefix Streams all the traceroutes passing through the specified host. Only for traceroute measurements. Streams all the traceroutes passing through a host in the specified prefix. Only for traceroute measurements. Immediately fetch the last few minutes of results for a specific measurement ID. Mostly intended to cover the gap between the last available data in the REST API and the currently streamed results, and to recover results that might have been missed during brief disconnections. 					

EX2: Monitoring server reachability



- Same situation as in the exercise before, but you didn't schedule a measurement in advance
 - You don't have a measurement ID
- You want to get all the measurements reaching 216.58.212.227
- Now restrict the results to just include ping measurements



Command-line Interface (CLI) Toolset

Section 15

RIPE Atlas CLI



- Familiar output (ping, dig, traceroute)
- Linux/OSX
 - http://ripe-atlas-tools.readthedocs.org/en/latest/ installation.html#requirements-and-installation
- Windows [experimental]
 - https://github.com/chrisamin/ripe-atlas-tools-win32

RIPE Atlas CLI

Open source

- RIPE NCC led community contribution
- Documentation
 - https://ripe-atlas-tools.readthedocs.org/
- Source:
 - https://github.com/RIPE-NCC/ripe-atlas-tools/

Install RIPE Atlas tools

• OSX:

- sudo easy_install pip
- sudo pip install ripe-atlas-tools
- Linux:
 - Available from many package repositories
 - ... or same as in OSX

Configure RIPE Atlas CLI



- Reuse the API key of the first exercise
 - Or create a new one at https://atlas.ripe.net/keys/
- Configure your CLI
 - ripe-atlas configure --set authorisation.create=MY_API_KEY

Fetch an existing measurement



- Fetch the ping measurement 2340408
 - ripe-atlas report 2340408

Search probes



- Search all probes in AS 3333
 - ripe-atlas probe-search --asn 3333
- Show specific fields
 - ripe-atlas probe-search --asn 3333 --field asn_v6 -field country --field description --field status

Create a measurement



- Create a ping measurement to wikipedia.org
 - One-off, default parameters
 - ripe-atlas measure ping --target wikipedia.org

Looking good! Your measurement was created and details about it can be found here:

```
https://atlas.ripe.net/measurements/3499718/
```

Connecting to stream...

48	bytes	from	probe	#18433	94.112.176.45	to	91.198.174.192	(91.198.174.192):	ttl=50	times:41.979,	41.492,	40.769,
48	bytes	from	probe	#20111	37.151.230.180	to	91.198.174.192	(91.198.174.192):	ttl=57	times:100.511,	100.136,	100.325,
48	bytes	from	probe	#25003	176.193.48.211	to	91.198.174.192	(91.198.174.192):	ttl=59	times:47.967,	47.476,	47.403,
48	bytes	from	probe	#20313	5.199.160.9	to	91.198.174.192	(91.198.174.192):	ttl=58	times:36.501,	36.245,	36.285,
48	bytes	from	probe	#22573	89.176.43.44	to	91.198.174.192	(91.198.174.192):	ttl=52	times:28.747,	27.712,	28.446,
48	bytes	from	probe	#19413	89.71.47.56	to	91.198.174.192	(91.198.174.192):	ttl=51	times:49.89,	49.779,	50.277,
48	bytes	from	probe	#18635	78.52.132.137	to	91.198.174.192	(91.198.174.192):	ttl=57	times:37.462,	38.095,	37.73,
48	bytes	from	probe	#23223	62.65.126.46	to	91.198.174.192	(91.198.174.192):	ttl=53	times:23.169,	23.412,	33.067,
48	bytes	from	probe	#17511	87.81.148.2	to	91.198.174.192	(91.198.174.192):	ttl=56	times:13.281,	12.885,	13.039,
48	bytes	from	probe	#12584	46.175.22.202	to	91.198.174.192	(91.198.174.192):	ttl=59	times:36.073,	35.788,	35.883,

Other examples of ping



- Geo-specific from 20 probes from Canada:
 - ripe-atlas measure ping --target example.com --probes 20
 --from-country ca
- 20 Canadian probes that definitely support IPv6:
 - ripe-atlas measure ping --target example.com --probes 20
 --from-country ca --include-tag system-ipv6-works
- Create a recurring measurement:
 - ripe-atlas measure ping --target example.com --interval 3600



Using RIPE Atlas CLI

Exercise F

Preparation for the exercise



- UNIX/LINUX/OSX:
- Terminal:
 - sudo easy_install pip
 - sudo pip install ripe-atlas-tools
 - choose "Install" in pop-up
 - ripe-atlas configure --set authorisation.create=MY_API_KEY

Create measurement to test reachability

- Use the traceroute command to test the reachability of:
 - wikipedia.org
 - on TCP port 443
 - from 20 probes
 - in France



Use Cases

Section 16





Using RIPE Atlas to Validate International Routing Detours

Anant Shah — 30 Jan 2017

A Quick Look at the Attack on Dyn

Massimo Candela 🌢 — 24 Oct 2016

Contributors: Emile Aben

Using RIPE Atlas to Monitor Game Service Connectivity

Annika Wickert — 14 Sep 2016

Using RIPE Atlas to Measure Cloud Connectivity

Jason Read — 06 Sep 2016

Using RIPE Atlas to Debug Network Connectivity Problems

Stéphane Bortzmeyer — 10 May 2016

RIPE Atlas IXP Country Jedi (1)

- Do paths between ASes stay in country?
- Any difference between IPv4 and IPv6?
- How many paths go via local IXP?
- Could adding peers improve reachability?

https://www.ripe.net/ixp-country-jedi

- Experimental tool
 - Feature requests welcome!
 - Depends on probe distribution in country

RIPE Atlas IXP Country Jedi (2)

Methodology

- Trace route mesh between RIPE Atlas probes
- Identifying ASNs in country using RIPEstat
- Identifying IXP and IXP LANs in PeeringDB



Figure 1: Visual representation of IPv4 paths (left) and IPv6 paths (right) between selected RIPE Atlas probes in Sweden

IXP IPs: YES, out-of-country IPs: NO IXP IPs: NO, out-of-country IPs: NO IXP IPs: YES, out-of-country IPs: YES IXP IPs: NO, out-of-country IPs: YES

Use Cases (2)



- DDoS Attack on Dyn DNS Servers (Oct. 2016)
 - 10s millions devices Mirai botnet
 - Legitimate requests



Use Cases (3)



- Monitor Game Service Connectivity (Sept. 2016)
- Requirements:
 - Check General Reachability, Latency, Historical data
 - Supported by an active and helpful community
 - Integrate with their existing logging system
- Track down an outage in one upstream
- Became sponsors



Use Cases (4)



- Amsterdam Power Outage (March 2015)
- When and where the outage was happening





More RIPE Atlas Features

Section 17

Secure Measurement creation and sharing

- Use API keys to:
 - Create measurements without logging in
 - Securely share your measurement data with others
- To create, manage and delete API keys:
 - https://atlas.ripe.net/keys/
 - https://atlas.ripe.net/docs/keys2/
- Examples:
 - https://atlas.ripe.net/docs/rest/

Security Aspects



• Probes:

- Hardware trust material (regular server address, keys)
- No open ports; initiate connection; NAT is okay
- Don't listen to local traffic
- No passive measurements
- Measurements triggered by "command servers"
 - SSH connections from probe to server
 - initiated by probe
- Measurement code published

Additional Membership Benefits



- RIPE Atlas:
 - Guaranteed to host a probe
 - Do NOT have to host probe to perform customised measurements
 - 1,000,000 extra credits monthly via LIR Portal
 - "Quick Look" measurements via LIR Portal
 - IPv6 reachability testing (free)
 - Share probe management with LIR colleagues
- RIPEstat:
 - Historical view of RIPE Database objects



Take Part in the RIPE Atlas Community

Section 18

RIPE Atlas community (part 1)



- Volunteers host probes in homes or offices
- Organisations host RIPE Atlas anchors
- Sponsor organisations give financial support or host multiple probes in their own networks

RIPE Atlas community (part 2)



- Ambassadors help distribute probes at conferences, give presentations, etc.
- Developers contribute free and open software
- Network operators create measurements to monitor and troubleshoot
- Researchers and students write papers

Hosting a probe



- Create a RIPE NCC Access account
- Go to https://atlas.ripe.net/apply
- You will receive a probe by post
- Register your probe
- Plug in your probe
- If you receive a probe from an ambassador (trainer, sponsor, someone at a conference), just register it and plug it in!

Road map



- What we are planning to do:
- To involve the community
- To gather feedback

https://atlas.ripe.net/docs/roadmap/





- https://atlas.ripe.net
- http://roadmap.ripe.net/ripe-atlas/

- Users' mailing list: <u>ripe-atlas@ripe.net</u>
- Articles and updates: <u>https://labs.ripe.net/atlas</u>
- Questions and bugs: <u>atlas@ripe.net</u>
- Twitter: @RIPE_Atlas and #RIPEAtlas



Questions





kahoot





Graduate to the next level!

http://academy.ripe.net



tuitter

@TrainingRIPENCC


https://www.ripe.net/training/mat/survey

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დასასრული Pabaiga					Olutt
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