SKYLIGHT™ PVX

PVX Summit - July 2018

PVQL: accessing data at the speed of light and enabling new use of performance insights with Spring 18 version

Thierry Notermans

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Agenda - PVQL

1. Introduction : PVQL - The origins
2. How to use it
3. Use cases
4. Let’s define the roadmap together

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PVX API: Smooth Integration

PVQL (Performance Vision Query Language) has been built to make powerful API…

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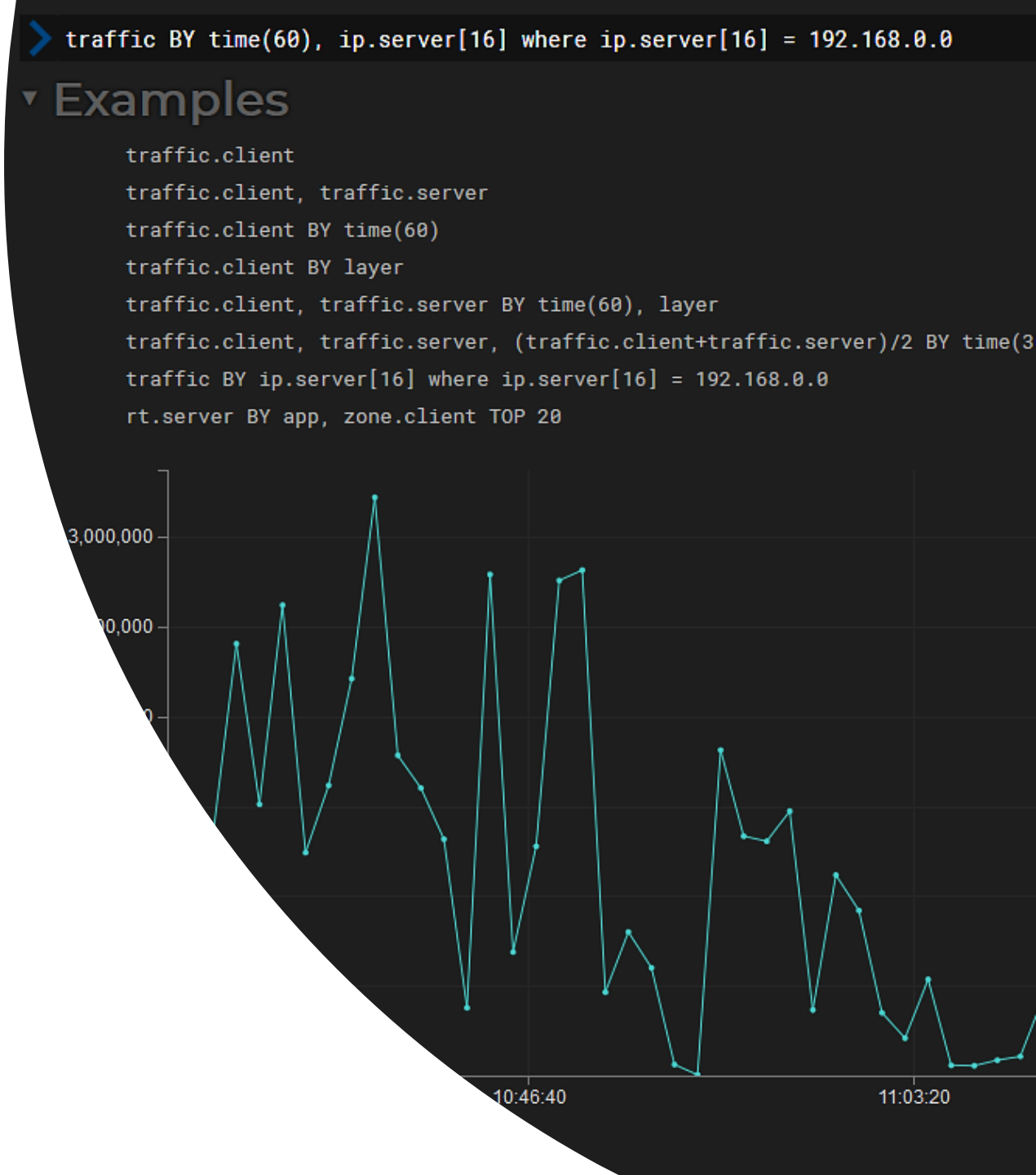
Built-In Shell

Free your Imagination and write your own Queries

https://<probe_IP>:443/shell

The shell has been mainly developed for R&D purposes : API code validation !

… still in version 0.1



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PVX

Introduction : PVQL – The origins

- PVQL provides the flexibility to query exactly what you want, in realtime
  - Which metrics
  - How to group them
  - Statistical operations
  - Sorting
  - Period of time
  - Filters
- PVQL provides an easy and intuitive language

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build-queries-from-form

Build PVQL queries from a form description

Arguments

- `type` : the type of representation
- `exprs` : list of formatted expressions for the value part
- `layer` : the source name
- `groups` : list of formatted expressions for the key part
- `filter` : formatted expression for the filter
- `top` : amount of rows to extract

Note

No quoting is applied to the arguments. So they must be all already properly quoted.

Examples

```
>>> build_queries_from_form(type='value', exprs=['traffic.client'])
{'type': 'VALUE',
 'queries': {'main': 'traffic.client FROM l3',
             '@sparkline': 'traffic.client FROM l3 BY time(60pt)'}}
```

Built-in Documentation

https://<probe_IP>:443/api/doc

This first version 0.1 will slightly change in the future...

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PVX

How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Provides the PVX metric value(s)
Complete list available at https://<probe_IP>:443/api/0.1/doc/definitions

Examples

traffic	Traffic in both directions expressed in MB
server.traffic	Traffic from the servers expressed in MB
rtt.total	Average round trip time
client.rtt	Average client RTT
user.experience	Average end-user experience (previous EURT)
server.rt	Average server response time

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How to use PVQL

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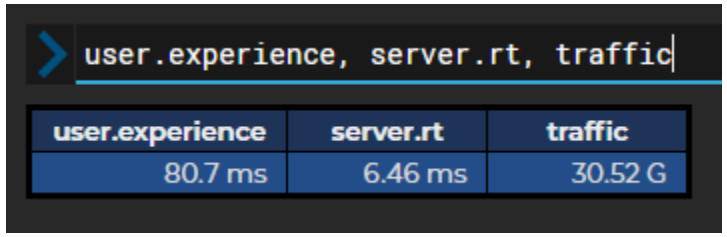
Provides the PVX metric value(s)
Complete list available at https://<probe_IP>:443/api/0.1/doc/definitions

To request multiple values at once, use a comma as separator:



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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Provides the PVX metric value(s)
Complete list available at https://<probe_IP>:443/api/0.1/doc/definitions

You can perform calculations

+	Sum
-	Difference
*	Multiplication
#	Count

```
#client.ip, #server.ip, client.rtt/server.rtt
```

<expr>	<expr>	<expr>
3.31 k	850	3.49

It's then advisable to add a title

```
#client.ip AS "nb of connected clients", #server.ip AS "nb of connected servers" client.rtt/server.rtt AS "RTT ratio"
```

nb of connected clients	nb of connected servers	RTT ratio
3.31 k	850	3.41

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How to use PVQL

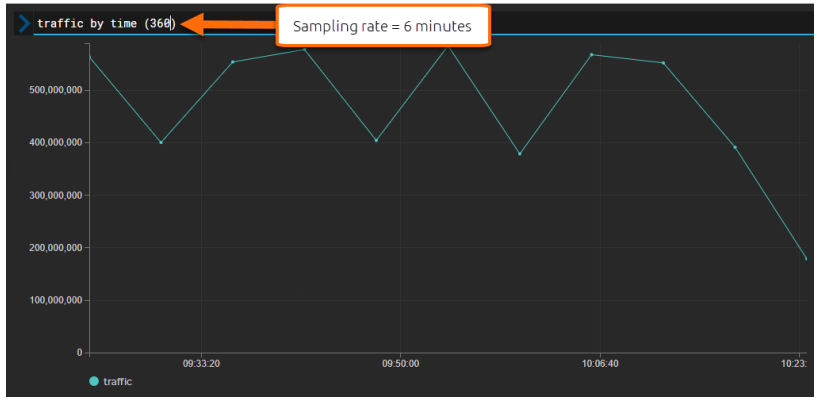
The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to group requested metrics by categories

Examples

BY application	Metric values grouped by application recognized by PVX
BY client.zone	Metric values grouped by client zone
BY time (3600)	Metrics values presented in a time-based chart The value provides the sampling rate in the chosen timeframe



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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to group requested metrics by categories

You can group by multiple categories to obtain matrix view (with comma as separator)

```
traffic BY application, server.zone
```

application	/Private/Servers/Citrix	/Private/Servers/Datacenter2/SQL server	/Private/Servers/Datacenter1/Web ERP	/Private/Servers/Exchange	/Private	/Private/Servers/Postgresql-Server	/Private/Servers/Datacenter1	/Private/Remote_sites/New York
citrix-sr	4.11 G							
ERP-Back-End		428.67 M						
ERP-Front-End			55.93 M					
File sharing		46.06 M						938
DX CARE / Crossway				32.13 M				
NC					23.85 M	4.72 M	379.11 k	592.13 k
hbci					12.27 M			
e-shop back						3.11 M		
Intranet-Sharepoint					324.66 k		3 M	
ms-sql-s					2.32 M			248
https								2.19 M
sip					1.08 M			
gre								
MS Sharing								311.15 k
CRM								240.15 k
icmp		47.32 k		148	9.09 k		518	198.5 k
snmp								175.72 k
MS DTC		139.66 k						
Home Web Mail								
netbios-ssn		65.31 k						558
domain								

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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to filter the results

Examples

WHERE application != « http »	The result excludes the metric values related to the « http » application
WHERE client.ip[16] = 192.168.0.0	Metric values provided for the clients in the subnet 192.168.0.0/16

Filters can be combined

WHERE (application = "http" OR application = "https") AND server.zone IN "/Local"

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How to use PVQL

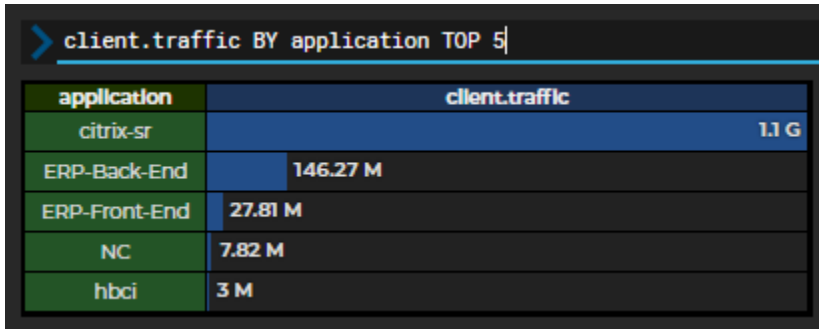
The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to keep the top values, potentially in a range of values

Example of keeping the top 5 values

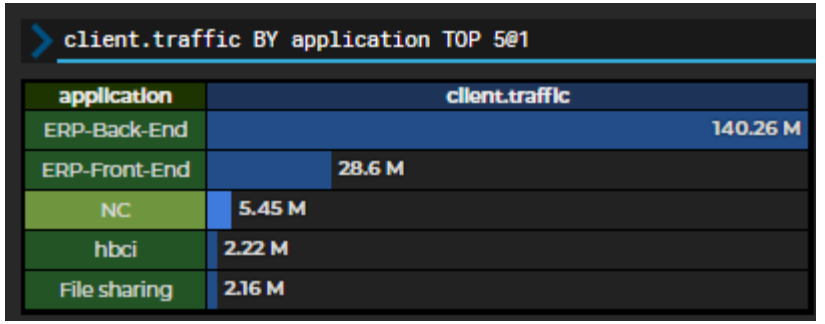
client.traffic BY application TOP 5



Example of keeping the top 5 values, exluding the first one (so second to sixth)

client.traffic BY application TOP 5@1

Offset value



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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to keep the top values, potentially in a range of values

Example of keeping all values but the first one

client.traffic BY application TOP ALL@1

client.traffic BY application TOP ALL@1

application	client.traffic
ERP-Back-End	136.44 M
ERP-Front-End	29.76 M
NC	8.95 M
File sharing	2.27 M
hbci	2.22 M
DX CARE / Crossway	1.63 M
e-shop back	1.61 M
Intranet-Sharepoint	924.01 k
sip	633.3 k
https	553.91 k
icmp	418.11 k
gre	380.46 k
Home SMTP	310.81 k
CRM	197.41 k
ms-sql-s	184.22 k
MS Sharing	167.99 k
MS DTC	108.97 k
snmp	90.18 k
netbios-ssn	48.55 k
domain	27.82 k
MS Active Directory	26.88 k
syslog	20.83 k
MS File Replication	17.2 k
oracle-dbm	14.27 k
MS DCOM Services	13.45 k
ldap	8.8 k
netbios-ns	7.61 k
MS Security	7.02 k
redwood-broker	6.79 k
mysql	6.4 k
...(11 mores)...	

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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to keep the top values or a range of values

How to sort data (only in combination with the TOP parameter)

{vi ASC/DESC, kj ASC/DESC}

kj = group j in the list of groups

vi = metric i in the list of metrics

ASC = ascending
DESC = descending

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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Used to keep the top values or a range of values

Examples

Without sorting

```
traffic, server.rt by server.zone TOP 10
```

server.zone	traffic	server.rt
/Private	19.09 G	5.34 ms
/Site2/Main Site	8.37 G	4.31 ms
/	3.51 G	49.33 ms
/Private/VPN	1.17 G	61.93 ms
/Cloud/Google/Gmail	30.8 M	65.24 ms
/Cloud/Amazon/EC2	6.44 M	1.35 s
/Cloud/Adobe/Marketing Cloud	641.39 k	52.73 ms
/Cloud/Amazon/Cloudfront	419.39 k	15.57 ms
/Site1	348 k	15.37 ms
/Cloud/Facebook	213.31 k	ø

With ascending sorting on « traffic »

```
traffic, server.rt by server.zone TOP 10 {v2 ASC}
```

server.zone	traffic	server.rt
/Cloud/Facebook	213.31 k	ø
/Cloud/Dropbox	79.43 k	ø
/Cloud/Amazon/Route53	17.26 k	ø
/Site2/Main Site	8.35 G	4.3 ms
/Private	18.45 G	5.37 ms
/Site1	348 k	15.37 ms
/Cloud/Amazon/Cloudfront	419.39 k	15.57 ms
/Cloud/Microsoft/Lync Online	70.37 k	18.66 ms
/	3.4 G	49.24 ms
/Cloud/Adobe/Marketing Cloud	641.39 k	52.73 ms

With descending sorting on server zone

```
traffic, server.rt by server.zone TOP 10 {k1 DESC}
```

server.zone	traffic	server.rt
/Site1	338.17 k	15.34 ms
/Site2/Main Site	7.94 G	4.5 ms
/Private/VPN	1.17 G	60.66 ms
/Cloud/Microsoft/Office 365	110.55 k	185.99 ms
/Cloud/Microsoft/Lync Online	61.72 k	18.35 ms
/Cloud/Google/Gmail	30.2 M	64.91 ms
/Cloud/Facebook	213.31 k	ø
/Cloud/Dropbox	79.43 k	ø
/Cloud/Amazon/Route53	17.26 k	ø
/Cloud/Amazon/EC2	6.42 M	1.3 s

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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Lets you specify which layer to request
By default, PVQL requests data from all L2-L4

Possible layers (must be lower case)

l3	tcp udp icmp other_ip non_ip
http	
sql	
citrix	
citrix_channels	
smb	
voip	
dns	

Examples

```
server.rt BY application FROM sql
```

application	server.rt
postgresql	5.51 ms
sql-server	937.73 µs
oracle	558.08 µs
mysql	423.94 µs

```
server.rt BY application FROM smb
```

application	server.rt
MS SCM	21 ms
MS Sharing	8.02 ms
MS Remote Services	6.88 ms
smb	4.65 ms
MS Security	3.63 ms
MS DLT	2.43 ms
MS Active Directory	2.11 ms
MS Indeterminate	694.06 µs
MS DFS	331.13 µs
MS Storage	284.69 µs

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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Lets you specify which aggregation level to query
Is not limited to the aggregation levels of Nevrax (ex. : it is possible to ask for 1 minute granularity for 30 days or more)
The limit depends on the disk space capacity

Possible values : 1m, 1h and 1d

Aggregation level by default :
L1 (1m) up to 6 hours
L2 (1h) from 6 hours to 5 days
L3 (1d) – from 5 days

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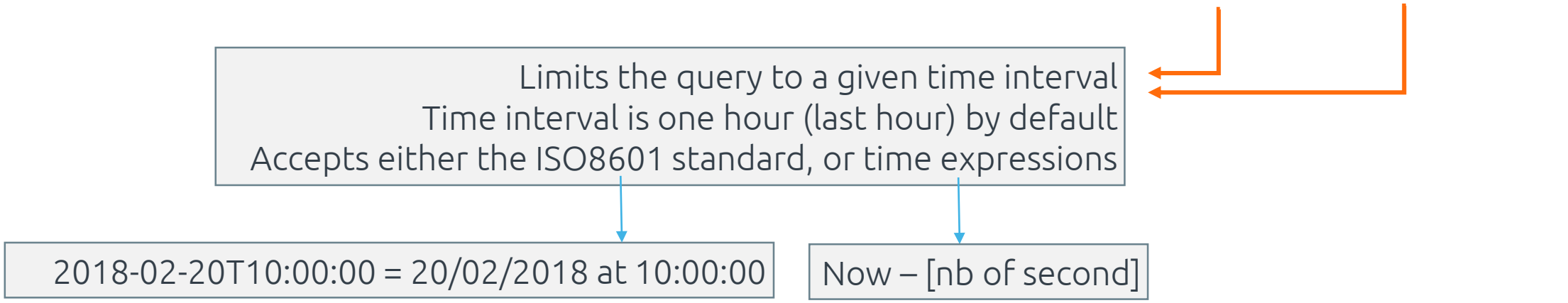
PVX

How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]



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How to use PVQL

The PVQL syntax

<metric(s)> [BY <xxx>] [WHERE <xxx>] [TOP <xxx>] [FROM <xxx>] [PRECISION <xxx>] SINCE <xxx> [UNTIL <xxx>]

Limits the query to a given time interval
Time interval is one hour (last hour) by default
Accepts either the ISO8601 standard, or time expressions

Example

```
traffic SINCE $(2018-05-29T10:00:00) UNTIL $now-60*60
```

traffic
1.79 T

Example (last 2 hours)

```
traffic SINCE $now-60*60*2 UNTIL $now
```

traffic
64.11 G

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Use cases

In addition to API validation, what can PVQL be typically used for ?

1. Fast data discovery/correlations
2. Perform calculations
3. Create detailed matrix

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In addition to API validation, what can PVQL be typically used for ?

1. Fast data discovery/correlations
2. Perform calculations
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Fast data discovery/correlation

Some examples…

Are all applications using the network efficiently?

Discover Realtime tagged applications (DSCP = 32)

How many users have used the applications the last hour?

Dupacks client/server

Application chain discovery

Slowest significant server

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Fast data discovery/correlation

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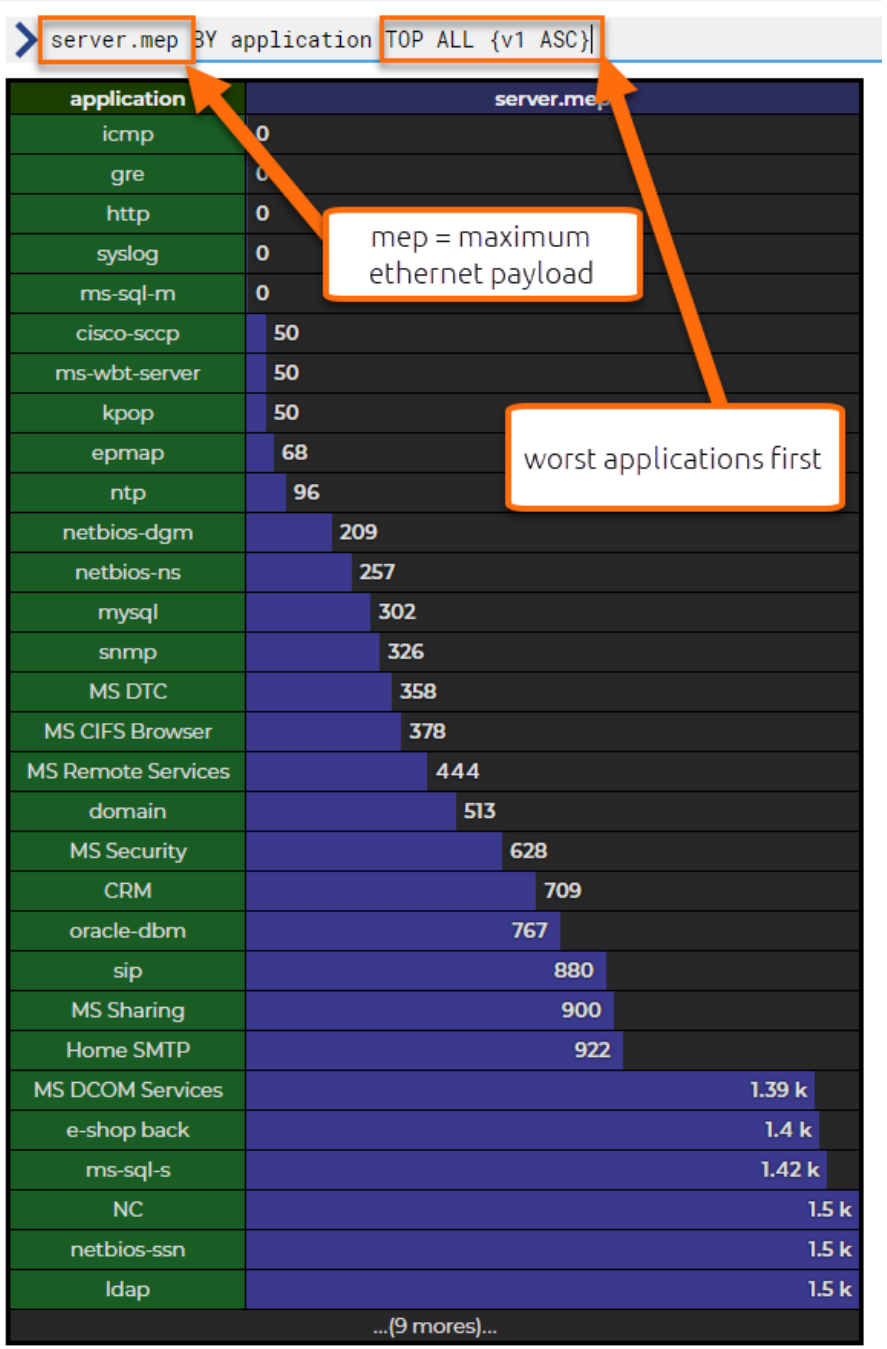
Use cases

Are all applications using the network efficiently

- Question : What about maximum pdu size per application?



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Fast data discovery/correlation

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Use cases

Discover realtime tagged applications (DSCP = 32)

› Question 1 : Is there any realtime tagged application on the network?

```
traffic by client.diffserv
```

client.diffserv	traffic
<diffserv: #32>	2.67 G
<diffserv: #0>	1.93 G
<diffserv: #8>	221.24 M
<diffserv: #10>	128.9 M
<diffserv: #14>	61.67 M
<diffserv: #18>	7.25 M
<diffserv: #46>	3.25 M
<diffserv: #24>	809.48 k
<diffserv: #26>	364.57 k
ø	84.67 k
<diffserv: #4>	49.57 k
<diffserv: #2>	16.51 k
<diffserv: #48>	7.79 k

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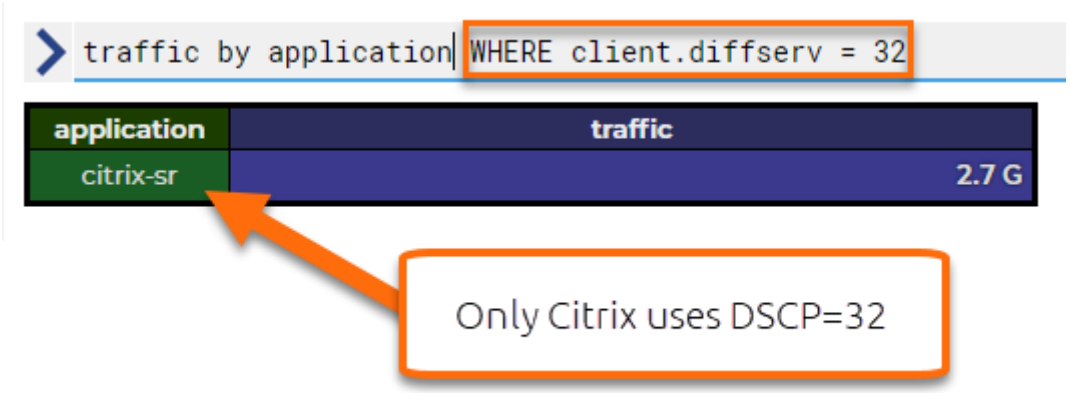
Use cases

Discover realtime tagged applications (DSCP = 32)

› Question 2 : What applications are tagged with DSCP=32?



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Use cases

Discover realtime tagged applications (DSCP = 32)

› Question 3 : How many applications are being tagged?

```
traffic BY client.diffserv, application WHERE client.diffserv > 0
```

		application					
		citrix-sr	NC	sip	domain	mysql	icmp
client.diffserv	<diffserv: #32>	2.7 G					
	<diffserv: #8>	212.56 M					
	<diffserv: #10>	130.44 M					
	<diffserv: #14>	62.08 M					
	<diffserv: #18>	7.6 M					
	<diffserv: #46>		953.8 k				
	<diffserv: #24>			815.72 k			
	<diffserv: #26>			373.59 k			
	<diffserv: #4>				50.06 k		
	<diffserv: #2>					16.51 k	
	<diffserv: #48>						5.57 k

only tagged applications

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Fast data discovery/correlation

Some examples…

Are all applications using the network efficiently?

Discover Realtime tagged applications (DSCP = 32)

How many users have used the applications the last hour?

Dupacks client/server

Application chain discovery

Slowest significant server

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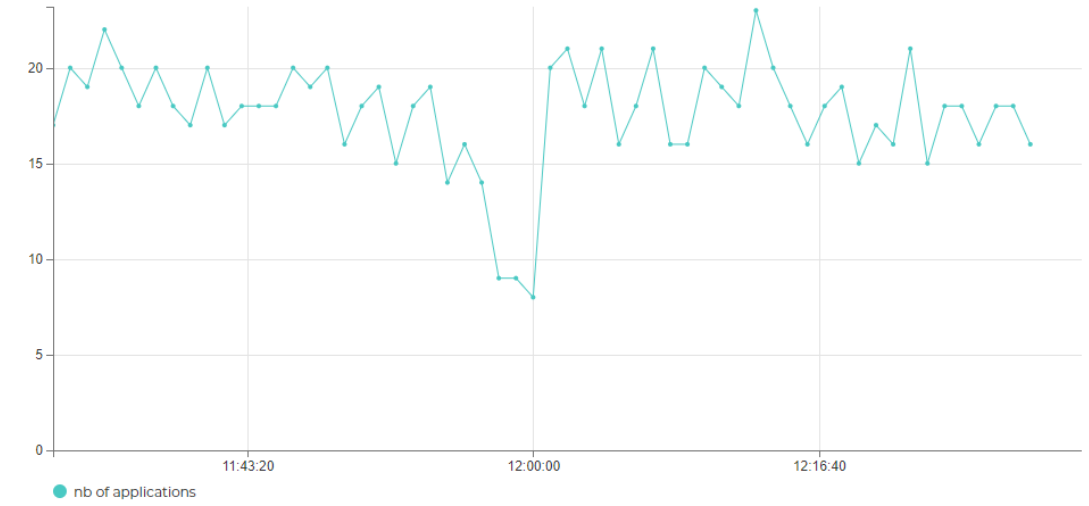
Use cases

How many users have used the applications the last hour?

```
#client.ip AS "nb of users" by time(60)
```


```
#application AS "nb of applications" by time(60)
```




```
#client.ip AS "nb of users" by application
```

application	nb of users
citrix-sr	669
ERP-Back-End	153
ERP-Front-End	26
icmp	25
domain	14
NC	13
sip	10
netbios-ssn	8
File sharing	6
DX CARE / Crossway	6
Intranet-Sharepoint	6
ntp	4
ms-sql-s	4
ms-sql-m	4
oracle-dbm	3
epmap	2
netbios-ns	2
netbios-dgm	2
ldap	2
https	2
mysql	2
MS Security	2
gre	1
http	1
snmp	1
syslog	1
cisco-sccp	1
e-shop back	1
kpop	1
Home SMTP	1
...(5 mores)...	

Fast data discovery/correlation

Some examples…

Are all applications using the network efficiently?

Discover Realtime tagged applications (DSCP = 32)

How many users have used the applications the last hour?

Dupacks client/server

Application chain discovery

Slowest significant server

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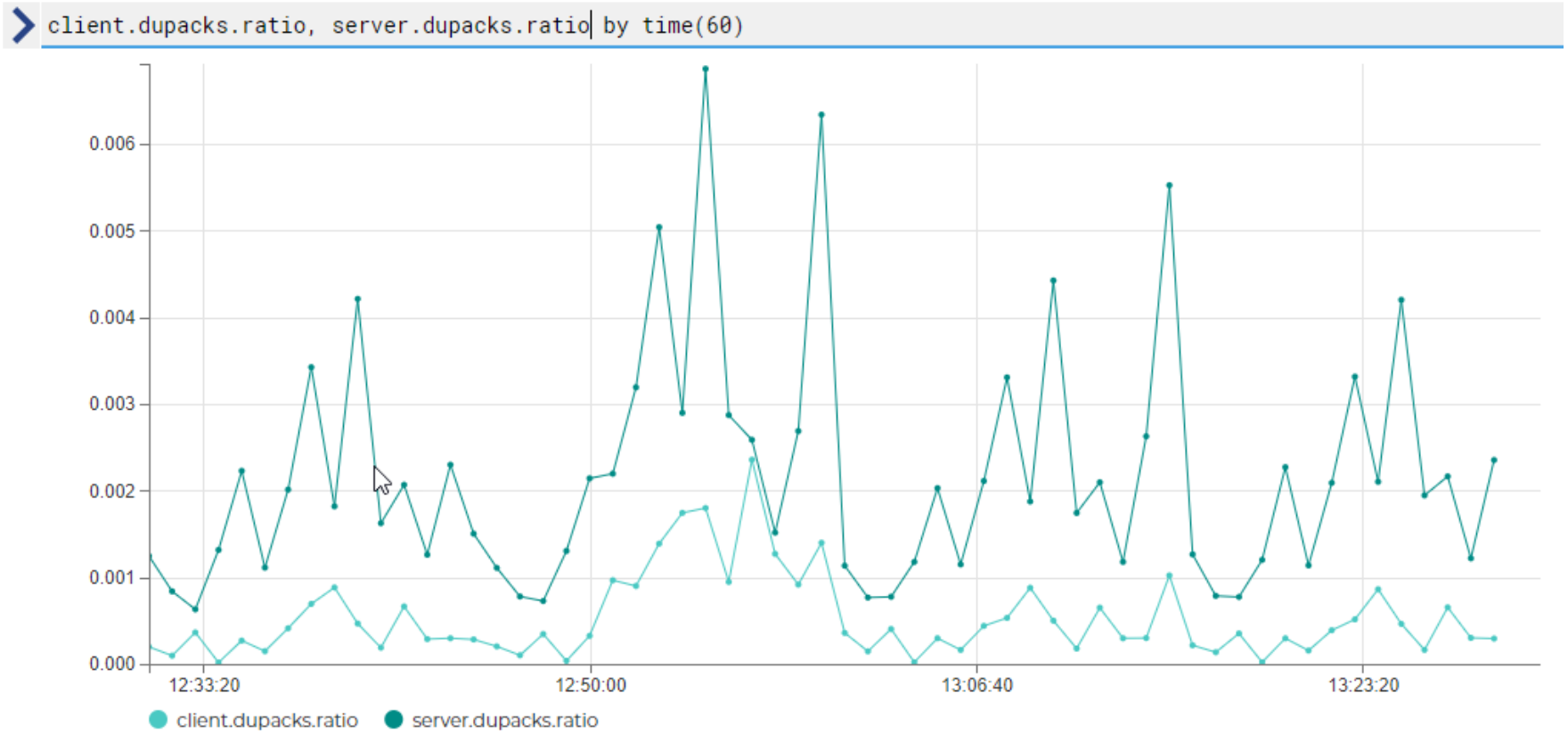
Use cases

Dupacks client/server

- Question 1 : Is there any correlation between client dupacks and server dupacks ratio?



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Use cases

Dupacks client/server

› Question 2 : Which client zones suffer from the biggest pourcentage of retransmission requests?

```
dupacks.ratio, dupacks, pdus BY client.zone
```

client.zone	dupacks.ratio	dupacks	pdus
/All/Private/Remote_sites/Lyon	10.24 m	681	66.52 k
/All/Private/Remote_sites/Berlin	9.86 m	296	30.02 k
/All/Private/Servers/Exchange	7.28 m	295	40.5 k
/All/Private/Remote_sites/Toronto	5.78 m	138	23.87 k
/All/Private/Remote_sites/Londres	3.47 m	348	100.15 k
/All/Private/Remote_sites/Marseille	2.89 m	165	57.04 k
/All/Private/Servers/Datacenter2	2.04 m	48	23.5 k
/All/Private/Remote_sites/Tokyo	1.57 m	3.97 k	2.53 M
/All/Private/Clients/Teleworkers	1.56 m	22.11 k	14.2 M
/All/Private/Servers/Datacenter1	1.14 m	545	476.49 k
/All/Private/Remote_sites/Madrid	1.04 m	2.92 k	2.82 M
/All/Private/Remote_sites/New York	693.3 µ	26	37.5 k
/All/Private	535.57 µ	99	184.85 k
/All/Private/Remote_sites/Lille	511.18 µ	46	89.99 k
/All	317.44 µ	145	456.78 k
/All/Private/Remote_sites/Bordeaux	288.28 µ	572	1.98 M
/All/Private/Remote_sites/Detroit	225.65 µ	1.04 k	4.62 M
/All/Private/Remote_sites/Amsterdam	0	0	162.21 k
/All/Private/Servers/Postgresql-Server	0	0	33.1 k
/All/Private/Servers/Datacenter2/SQL server	0	0	12.69 k
/All/Private/Servers/Datacenter2/Mail server	0	0	2.06 k
/All/Private/Servers/Datacenter1/Web ERP	0	0	520
/All/Private/Servers/MySql-Server/Mysql-Server-A	0	0	114

Taking the generated traffic into account, the teleworkers can be considered as the most impacted....

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Use cases

Dupacks client/server

› Question 3 : What about impacted applications for teleworkers?

```
dupacks.ratio, dupacks, pdus BY application WHERE client.zone = "/All/Private/Clients/Teleworkers"
```

application	dupacks.ratio	dupacks	pdus
citrix-sr	1.58 m	22.59 k	14.25 M

Teleworkers only use Citrix...

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Use cases

Dupacks client/server

› Question 4 : Are other sites impacted for Citrix traffic?

```
dupacks.ratio, dupacks, pdus BY client.zone WHERE application = "citrix-sr"
```

client.zone	dupacks.ratio	dupacks	pdus
/All/Private/Remote_sites/Tokyo	1.69 m	4.31 k	2.55 M
/All/Private/Clients/Teleworkers	1.58 m	22.72 k	14.42 M
/All/Private/Remote_sites/Madrid	1.01 m	2.92 k	2.87 M
/All/Private/Remote_sites/Bordeaux	300.75 µ	607	2.02 M
/All/Private/Remote_sites/Detroit	232.44 µ	1.08 k	4.63 M
/All	37.94 µ	17	448.06 k
/All/Private/Remote_sites/Amsterdam	0	0	162.08 k

Tokyo is also impacted.

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Use cases

Dupacks client/server

› Question 5 : What are the top 10 users impacted on both sites?

```
dupacks.ratio, dupacks, pdus BY client.ip, client.zone TOP 10 WHERE application="citrix-sr" AND (client.zone="/All/Private/Clients/Teleworkers" OR client.zone="/All/Private/Remote_sites/Tokyo")
```

		client.zone	
		/All/Private/Clients/Teleworkers	/All/Private/Remote_sites/Tokyo
client.ip	60.143.21.12	26.23 m 1.27 k 48.31 k	
	60.143.46.51	16.86 m 741 43.96 k	
	60.143.195.122	15.97 m 940 58.88 k	
	60.143.46.46	15.1 m 342 22.65 k	
	60.143.223.66		15.07 m 25 1.66 k
	60.143.34.245	14.41 m 409 28.38 k	
	60.143.34.252	13.36 m 1.24 k 92.83 k	
	60.143.58.50	13.28 m 1.75 k 132.04 k	
	60.143.46.43	13.22 m 898 67.9 k	
	60.143.195.119	12.36 m 605 48.95 k	

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Fast data discovery/correlation

Some examples…

Are all applications using the network efficiently?

Discover Realtime tagged applications (DSCP = 32)

How many users have used the applications the last hour?

Dupacks client/server

Application chain discovery

Slowest significant server

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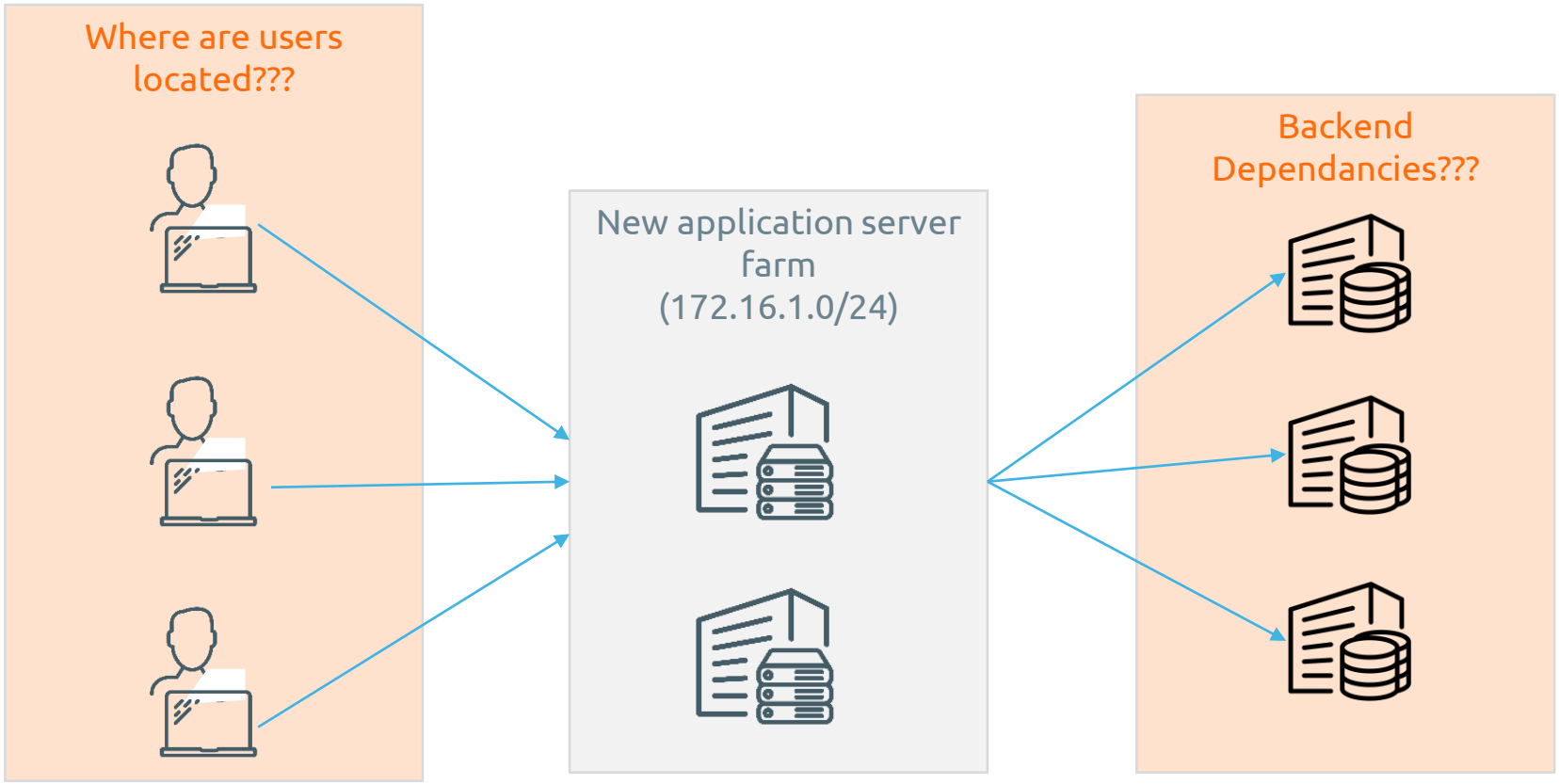
Use cases

Application chain discovery



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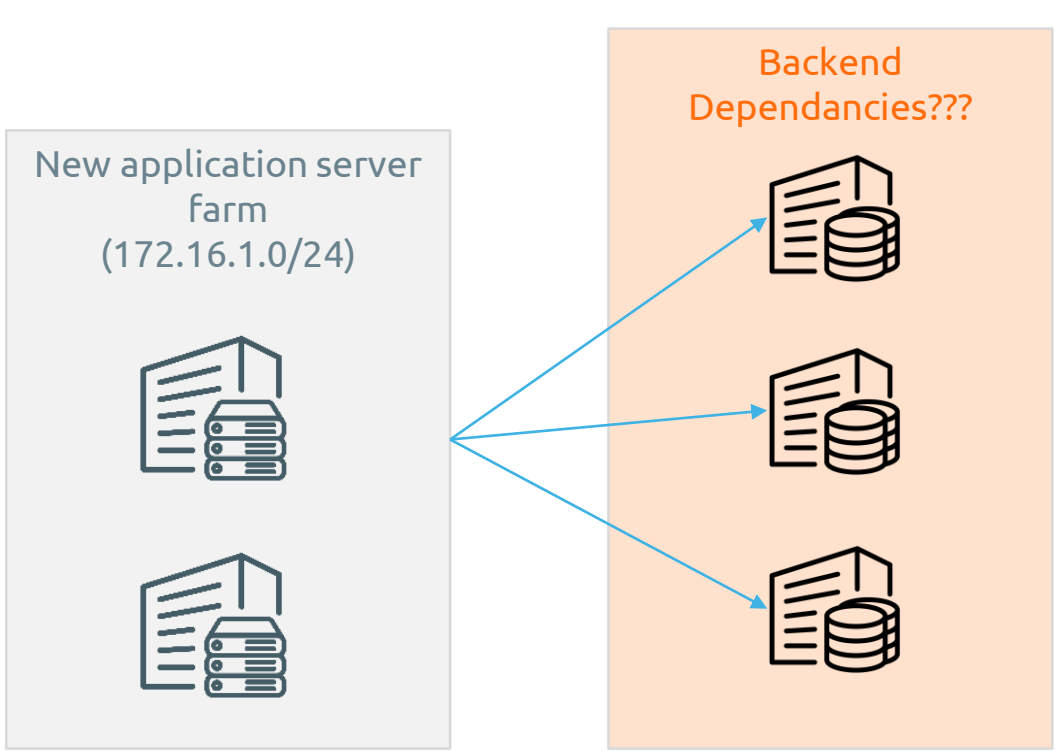
Use cases

Application chain discovery

› Question 1 : Which other servers is this server farm connecting to?




```
traffic by server.ip WHERE client.ip[24]=172.16.1.0 TOP 20 {k1 ASC}
```

server.ip	traffic
10.60.35.1	934.09 k
172.16.1.11	9.3 M
172.16.1.248	46.83 k
172.16.1.255	243
172.16.4.61	74
172.16.5.60	600
172.16.6.170	1.8 k
172.16.8.19	17.71 k
172.16.8.2	6.88 k
172.16.8.3	2.36 M
172.16.8.33	838.14 k
172.16.8.4	447.22 k
172.16.8.44	1.49 M
172.16.8.48	179.81 k
172.16.8.51	388
172.16.8.52	388
172.16.8.54	388
172.16.8.55	388
172.16.8.57	388
172.16.8.58	96.1 k

servers are clients of other servers located in another local network

servers within the server farm are inter-connected

servers are clients of other servers located in another subnet

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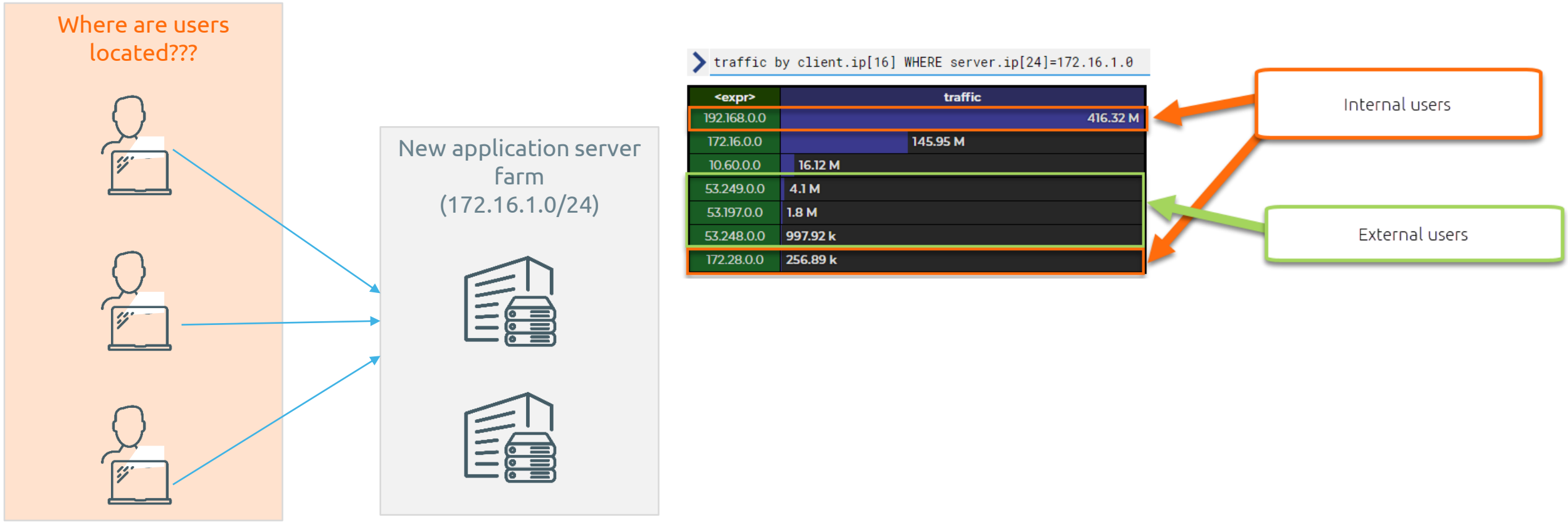
Use cases

Application chain discovery

› Question 2 : What are the users from?



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Fast data discovery/correlation

Some examples…

Are all applications using the network efficiently?

Discover Realtime tagged applications (DSCP = 32)

How many users have used the applications the last hour?

Dupacks client/server

Application chain discovery

Slowest significant server

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Use cases

The slowest significants servers…

› Asking for the top 20 slowest servers is not enough…

```
server.rt TOP 20 BY server.ip
```

server.ip	server.rt
192.168.1.221	20.13 s
172.16.1.10	1.42 s
172.16.8.44	1.33 s
172.16.8.58	1.28 s
192.168.181.39	1.08 s
192.168.181.49	813.63 ms
172.16.8.19	804 ms
172.16.8.33	664.84 ms
172.16.8.48	568.03 ms
172.16.8.3	278.13 ms
172.16.8.4	187.53 ms
60.231.39.173	170.5 ms
10.0.0.1	146.04 ms
60.231.39.97	101.1 ms
60.231.39.80	95.17 ms
172.16.1.11	90.14 ms
60.231.39.103	86.87 ms
10.26.53.144	80.1 ms
60.231.39.98	74.35 ms
60.231.39.102	72.45 ms

Is there a real impact on the users?
The number of transactions should be taken into account as well...

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Use cases

The slowest significants servers…

› Mixing SRT and number of transactions to sort by degree of relevance…

```
server.rt, server.rt.count BY server.ip TOP 20 {v2 DESC}
```

server.ip	server.rt	server.rt.count
172.16.1.11	93.32 ms	191.28 k
127.0.0.1	5 ms	8.54 k
60.231.39.107	37.46 ms	5.57 k
60.231.39.111	46 ms	4.36 k
60.231.39.104	37.12 ms	4.14 k
192.168.181.49	670.83 ms	3.98 k
60.231.39.101	47.53 ms	3.63 k
172.16.1.10	1.54 s	3.05 k
60.231.39.103	87.99 ms	2.9 k
60.231.39.100	42.33 ms	2.85 k
60.231.39.105	57.24 ms	2.67 k
60.231.39.156	42.6 ms	2.21 k
60.231.39.117	55.35 ms	1.74 k
60.231.39.96	48.62 ms	1.66 k
60.231.39.173	170.22 ms	1.59 k
60.231.39.84	40.73 ms	1.23 k
60.231.39.80	95.18 ms	912
60.231.39.98	73.95 ms	808
10.26.53.144	222.88 ms	800
172.16.8.4	162.62 ms	676

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Use cases

In addition to API validation, what can PVQL be typically used for ?

1. Fast data discovery/correlations
2. Perform calculations
3. Create detailed matrix

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Perform calculations

- Some examples…

Servers discovery based on connected clients

Worst HTTP site based on Page Load Time and Page Traffic

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Use cases

Servers discovery…

```
#client.ip AS "nb of connected users", #application AS "nb of applications on the server" by server.ip
```

server.ip	nb of connected users	nb of applications on the server
172.16.1.11	149	7
60.231.39.105	37	1
60.231.39.111	36	1
60.231.39.80	36	1
60.231.39.96	36	1
60.231.39.100	35	1
60.231.39.101	35	1
60.231.39.102	35	1
60.231.39.103	35	1
60.231.39.104	35	1
60.231.39.109	35	1
60.231.39.110	35	1
60.231.39.116	35	1
60.231.39.106	34	1
60.231.39.108	34	1
60.231.39.117	34	1
60.231.39.97	34	1
60.231.39.98	34	1
60.231.39.107	33	1
60.231.39.99	31	1
192.168.181.49	19	2
10.5.0.65	10	5
60.231.39.158	10	1
172.16.8.4	8	11
62.193.32.2	8	1
172.16.1.12	7	3
60.231.39.159	7	1
172.16.8.58	6	7
172.16.1.24	5	5
172.16.1.34	5	2
...(66 mores)...		

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Perform calculations

- Some examples…

Servers discovery based on connected clients

Worst HTTP site based on Page Load Time and Page Traffic

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Use cases

Worst HTTP site…

```
page.load.time/page.traffic, page.load.time, page.traffic, hit.rt FROM http BY server.ip
```

server.ip	<expr>	page.load.time	page.traffic	hit.rt
[redacted]	200.92 µ	157.93 ms	786	157.93 ms
	132.93 µ	104.48 ms	786	104.48 ms
	67.61 µ	53.15 ms	786	53.15 ms
	41.27 µ	32.4 ms	785	32.4 ms
	40.65 µ	31.95 ms	786	31.95 ms
	34.64 µ	83.03 ms	2.4 k	83.03 ms
	24.66 µ	135.82 ms	5.51 k	135.82 ms
	3.44 µ	4.92 s	1.43 M	112.25 ms
	3.24 µ	5.7 s	1.76 M	60.22 ms
	2.01 µ	19.16 ms	9.54 k	19.16 ms
	1.85 µ	117.37 ms	63.39 k	114.69 ms
	1.73 µ	161.42 ms	93.38 k	3.83 ms
	1.21 µ	11.16 ms	9.21 k	11.16 ms
	496.26 n	11.8 ms	23.78 k	11.75 ms
	491.59 n	20.79 ms	42.29 k	20.74 ms
	163.85 n	101.34 ms	618.5 k	100.87 ms
	15.68 n	1.45 s	92.44 M	518.62 ms
	6.09 n	6.79 ms	1.11 M	1.28 ms
	5.9 n	25.19 ms	4.27 M	18.63 ms
	4.32 n	37.48 µs	8.67 k	37.48 µs
	3.93 n	4.42 ms	1.12 M	4.39 ms
	2.61 n	14.71 ms	5.64 M	12.63 ms

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Use cases

In addition to API validation, what can PVQL be typically used for ?

1. Fast data discovery/correlations
2. Perform calculations
3. Create detailed matrix

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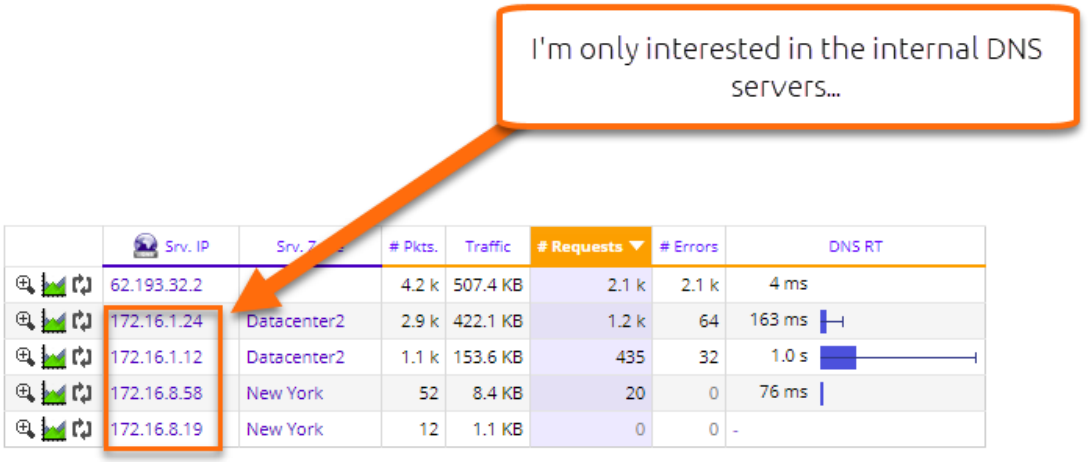
Use cases

Internal DNS Servers performance…



- In one view I want to see

Metric	Reason for the metric
Number of DNS requests	Is the information relevant?
Average DNS Response Time	Performances
DNS Response Time deviation	Stability
% of successful requests	Success rate

- I want to see these data per client zone, per type of DNS request and for the last 12 hours

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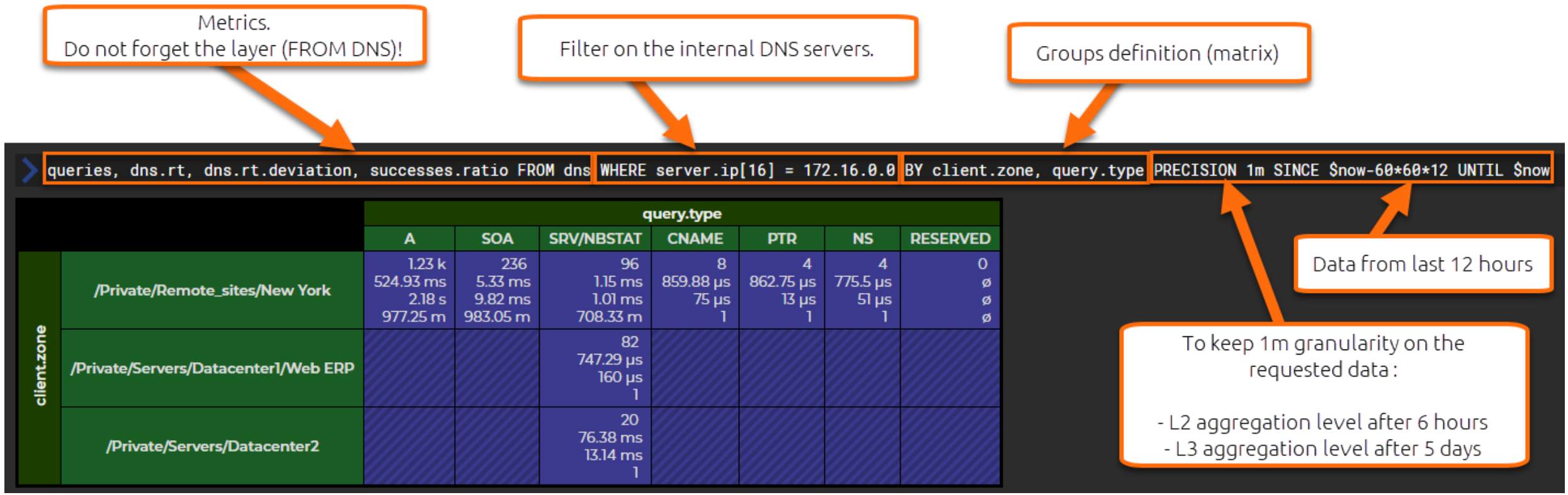
Use cases



client.zone	query.type	A	SOA	SRV/NBSTAT	CNAME	PTR	NS	RESERVED
	/Private/Remote_sites/New York	1.23 k 524.93 ms 2.18 s 977.25 m	236 5.33 ms 9.82 ms 983.05 m	96 1.15 ms 1.01 ms 708.33 m	8 859.88 µs 75 µs 1	4 862.75 µs 13 µs 1	4 775.5 µs 51 µs 1	0 ø ø ø
	/Private/Servers/Datacenter1/Web ERP			82 747.29 µs 160 µs 1				
	/Private/Servers/Datacenter2			20 76.38 ms 13.14 ms 1				

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Agenda - PVQL

1. Introduction : PVQL - The origins
2. How to use it
3. Use cases
4. Let’s define the roadmap together

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SKYLIGHT™ PVX

Let's define the roadmap together!

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