



Starting in a few minutes



Dashboard techniques to visualize system and business performance

2024

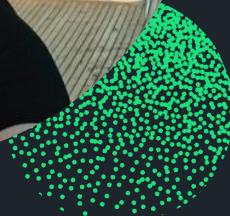
[Slides](#)





Dan Johnson

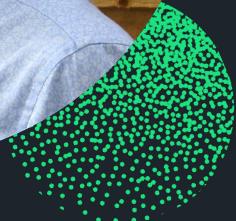
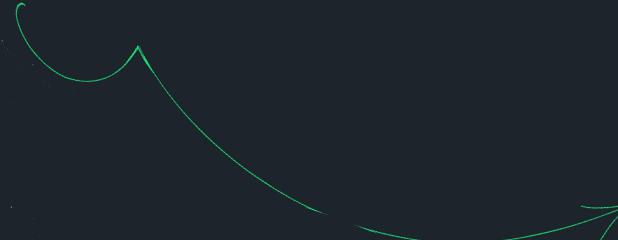
Lead Customer Training Specialist | New Relic





Liam Hurrell

Snr Manager, Customer Training | New Relic



Log out of other New Relic accounts (or open private browser window):

Login credentials

- Email: demotron@newrelicuniversity.com
- Password: o11y-as-code
- Provides read-only access to Demogorgon account (can create dashboards)
- Password does not change

Agenda

New Query Experience

Single 'Query your data' experience, keep context, survives navigation, new features

NRQL & Dashboard 101

Event data, event types, NRQL syntax in NRDB New Relic Database

Dashboard design strategies,

Pyramids (linked charts & dashboards), patterns, markdown annotation, wallboards

Trends and Comparing data sets

Multi-function/facet, COMPARE WITH, multi-query per chart, filter function

Using different chart types to visualize performance

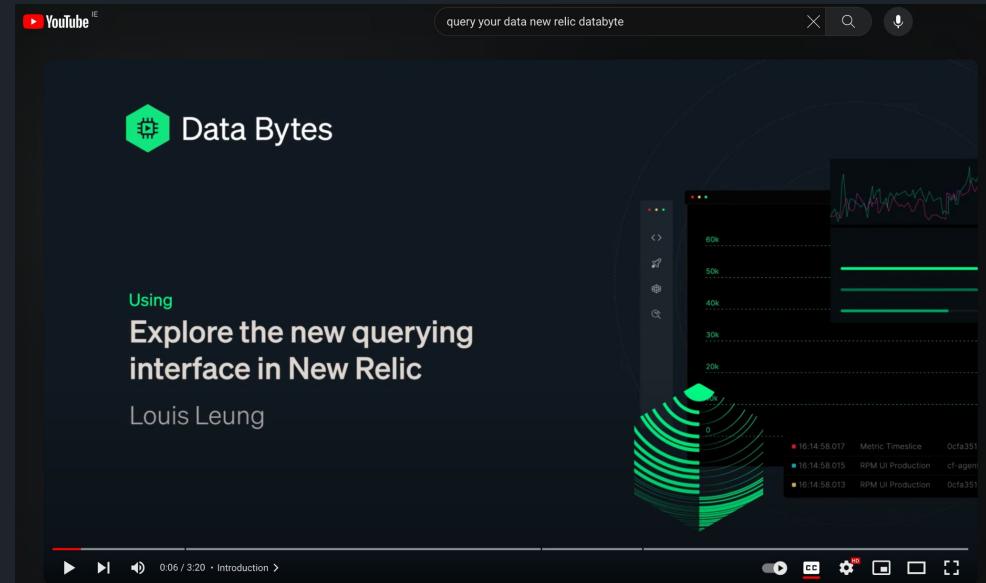
Funnels, Histogram, Heatmap

Going further

New Query Experience

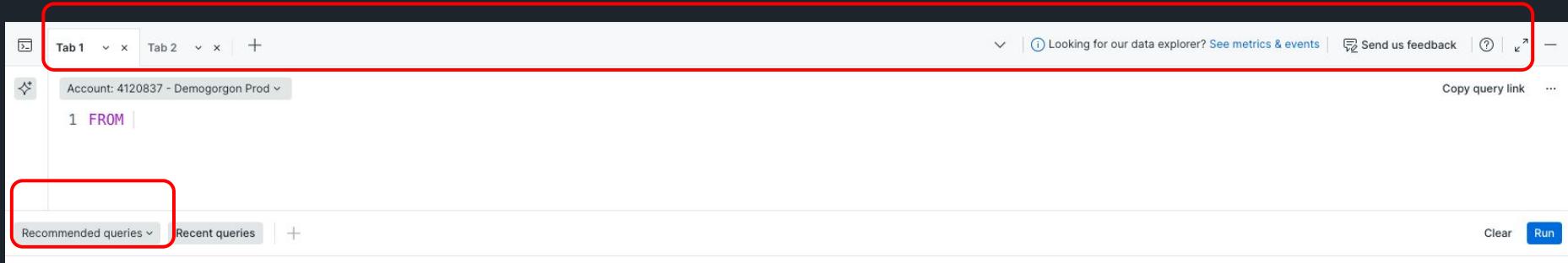
What's New?

- New, improved UI
- Replaces existing multiple query builders
- Explore with context
- Always present, survives navigation
- Minimizable & resizeable for large queries
- Cross account queries
- Multi-query
- Recommended queries button
- Natural language queries (New Relic AI)



<https://www.youtube.com/watch?v=sjms5NYRMLs>

New Query Experience



Explore the new 'Query your data' Console and UI

- Query your data - explore the UI and **options across the top** to see console & expand, minimise,
- + **Add a New Tab and** try **Recommended Queries** - try different **Chart Types**
- Check out the **Copy Query Link**
- Choose Console view  & explore different Entities across the platform in the main window (CMD / CTRL K)

NRQL, event data and attributes

NRQL Syntax, event types and
(custom) attributes

Explore events & event data in NRDB

Event data

- Event data is **schemaless**

Event types

- **Event types** are collected from agents (parts of the stack)

Discrete

- Events are **discrete** (individual) not regular

Dimensional

- Each event collects **attributes**
- Add custom attributes (business data)
- Use to group/**facet** after events

SELECT * FROM Transaction |

Add another query Your recent queries ▾

Since 60 minutes ago

TIMESTAMP	APP ID	APP NAME	CLUSTER NAME	CONTAINER ID	CONTAINER NAME	DEPLOYMENT NAME
April 20, 2021 10:47:59	541111744	Box	umbraprod.k8s.local	50ae9d9f7739b4ac6925e8f3bbdd541d9aaedba51b40a0f6ec93c1b4c38a0bb5	box	umbraprod
April 20, 2021 10:47:58	541111775	Order-Status	umbraprod.k8s.local	903db6b2fefa9a32f76bac851ebf4ca3686e6907eed30d6c8f9fd691fb442	order-status	umbraprod
April 20, 2021 10:47:58	62690774	Routing-Service	towerspprod.k8s.local		routing-service-2	towerspprod
April 20, 2021 10:47:58	62690787	Proxy-West	towerspprod.k8s.local		proxy-west-0	towerspprod
April 20, 2021 10:47:58	62690787	Proxy-West	towerspprod.k8s.local		proxy-west-0	towerspprod
April 20, 2021 10:47:58	62690774	Routing-Service	towerspprod.k8s.local		routing-service-2	towerspprod
April 20, 2021 10:47:58	62690774	Routing-Service	towerspprod.k8s.local		routing-service-2	towerspprod
April 20, 2021 10:47:57	109053836	Plan Service				
April 20, 2021 10:47:57	113207186	Promo Service				
April 20, 2021 10:47:57	113207186	Promo Service				
April 20, 2021 10:47:57	113207186	Promo Service				
April 20, 2021 10:47:57	43192130	Inventory Service				
April 20, 2021 10:47:57	43192130	Inventory Service				
April 20, 2021 10:47:56	62690849	Tower-Phoenix	towerspprod.k8s.local		tower-phoenix	towerspprod
April 20, 2021 10:47:56	62690787	Proxy-West	towerspprod.k8s.local		proxy-west-0	towerspprod
April 20, 2021 10:47:56	62690774	Routing-Service	towerspprod.k8s.local		routing-service-2	towerspprod

881,12 thousand events inspected in 52 ms (3.5 MBPS)

SELECT * FROM Transaction

Event type: Transaction

Attributes: TransactionType, Name,

AppName, Duration, http Response Code,

Some of the main event types

Browser

APM

Synthetics

Mobile

Infrastructure

PageView

Transaction

SyntheticCheck

MobileRequest

SystemSample

SELECT function(attribute) **FROM** EventType

FROM EventType **SELECT** function(attribute)

- Build queries around your **chosen Event type** (part of stack)
- Use the **auto-complete** to help write your queries
- Functions and attributes will be suggested for each Event type

NRQL Syntax

SELECT FROM

SELECT function(attribute) **FROM** EventType **WHERE** condition **FACET** group by

SELECT count(*) FROM Transaction

FROM Transaction SELECT count(*)

WHERE appName = 'Frontend' FACET name

WHERE appName = 'Frontend' FACET name

Lab: Explore your data

Try out these queries

Go to '**Query your data**'

1

Show event types

- What data (eventTypes) are reporting?

Look up event types and attributes in the **docs 'Attribute-dictionary'** here:
[New Relic data dictionary](#)

2

`SELECT * FROM Transaction`

- Explore the attributes (do you think any attributes are custom/business attributes??)

3

`SELECT count(*) FROM Transaction`

- Aggregate the data to retrieve a single value

4

`SELECT count(*) FROM Transaction FACET appName`

- Select DISTINCT values (Group by) using FACET

WATCH OUT! You can't FACET until you aggregate

`SELECT * FROM`

`SELECT count(*)`

Challenge!

Count transactions in Demogorgan Prod account. Are more related to USD or EUR currency attribute?

Write a query in the 'Query your Data' console

1

Hint : Use 'FROM Transaction'
Hint : Use FACET

```
SELECT count(*) FROM Transaction FACET currencyCode
```

Bonus: How do these numbers compare over time, for a week?

2

```
SELECT count(*) FROM Transaction WHERE currencyCode IN ('USD', 'EUR')  
SINCE 1 week ago  
FACET currencyCode  
TIMESERIES
```

Dashboard design strategies

Pyramids (linked charts & dashboards),
Patterns,
Markdown annotation,
Wallboards



Dashboard design

Are any of these statements familiar?

- How can I compare performance between systems / overtime?
- How can I get detailed analysis of performance / customer experience?
- I recognise a good dashboard design when i see one
- Custom dashboards are really powerful for us, but how do I design an effective one?

Dashboard design

Think about:

Who is it for?

Where will it be displayed?

When would / should they use it?

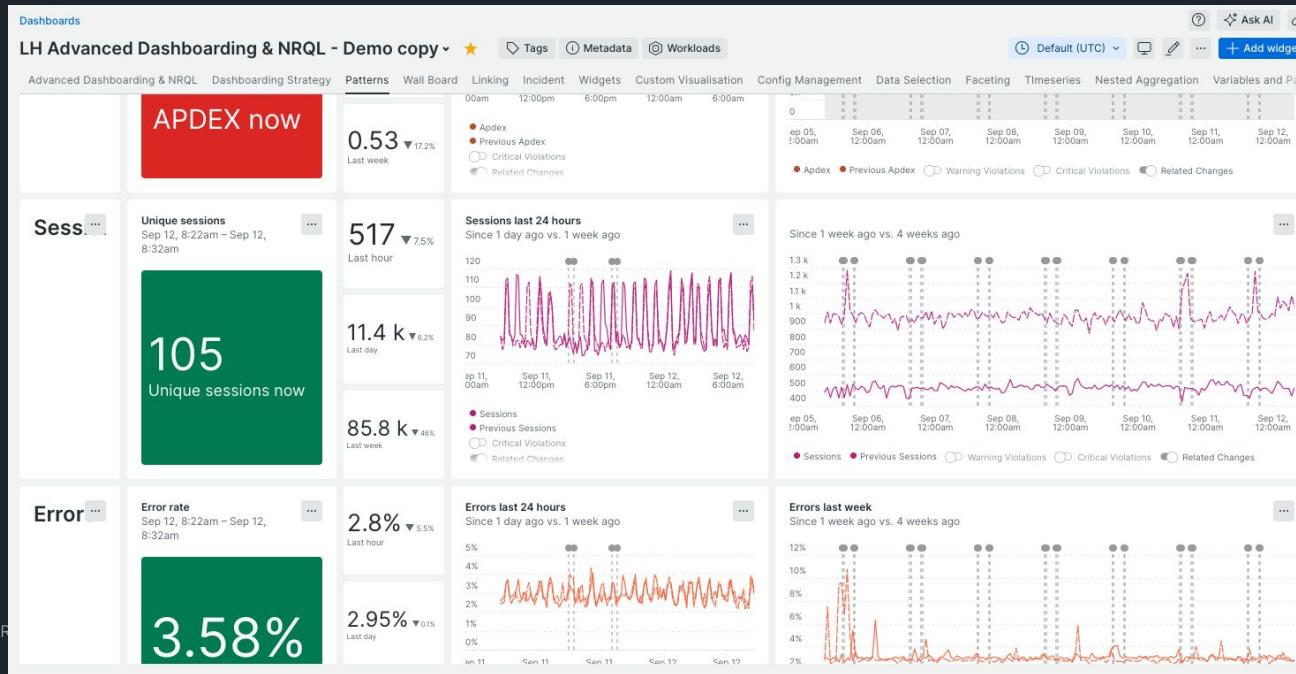
Why should they use it?

How should they use it?

Explore the demo dashboard

- Use the permalink shared by the Instructor

<https://onenr.io/0kjn4mkNXwo>



Dashboard design and layout tips

Pyramids, patterns and markdown annotation

Explore the Dashboard Strategy dashboard...

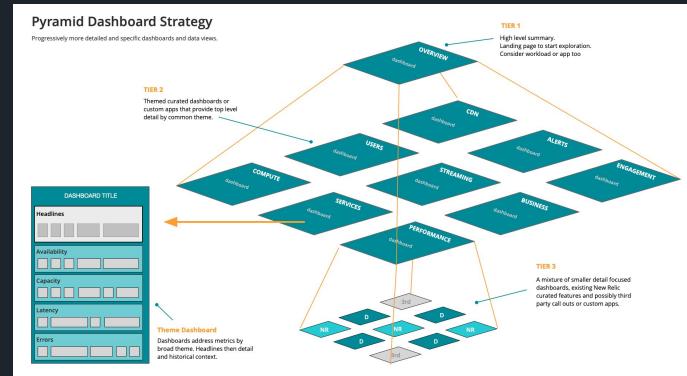
QUESTIONS:

How does it work?

What does it rely on to work?

Have you set up a structure like this?

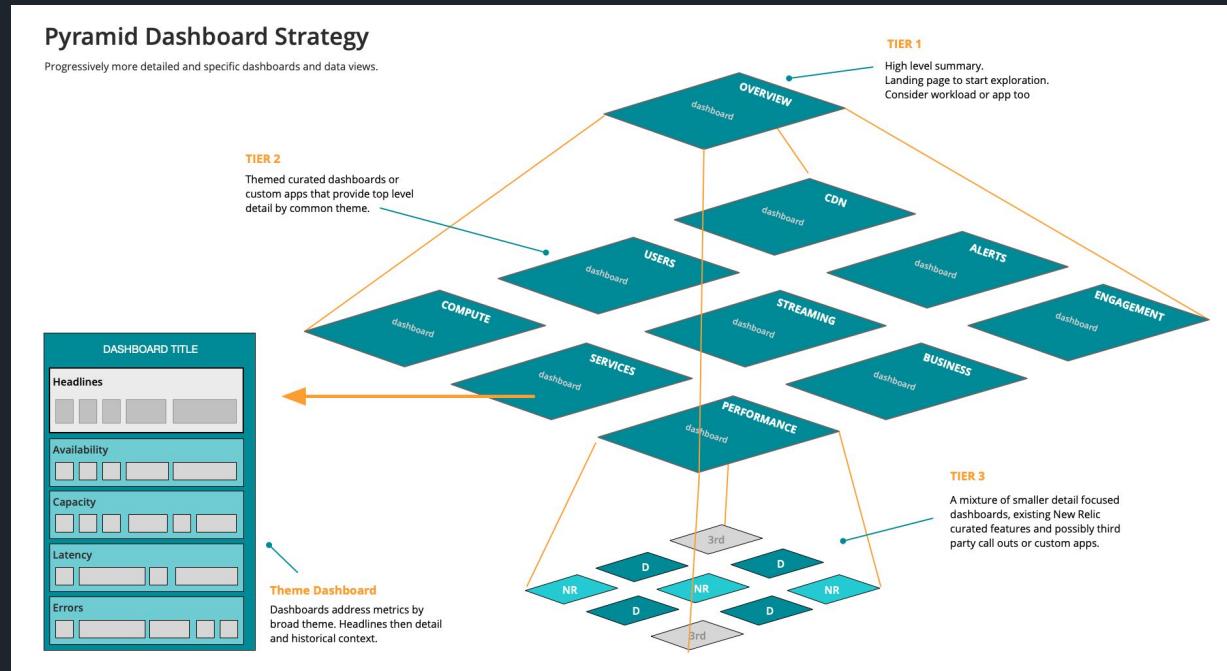
What tips would help make your dashboards more user friendly?



Dashboard design and layout tips

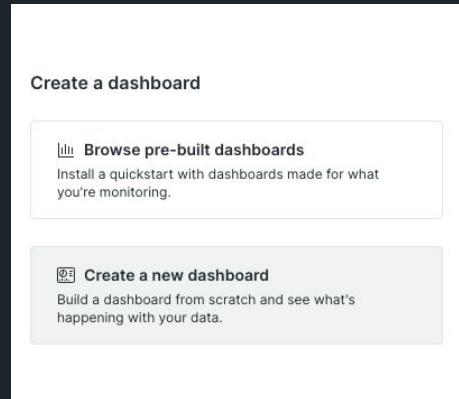
Pyramids, patterns and markdown annotation

- Pyramid
 - tiered structure, interactive
- Patterns
 - now, 24 hrs, 7 days
- Explain the dashboard
 - Markdown charts
 - what's good, bad, ugly
- Wall boards
 - TV mode, clear stats



Let's create a dashboard to use

- In 'Demogorgan Prod' account
- rename with your initials '**XX-Demo-DB**'
- Edit access



Create a dashboard

Dashboard name
XX-Demo DB

Select your account
Account: 4120837 - Demogorgan Prod ▾

Permissions ⓘ
Edit – everyone in account ▾

Back Create

Create a filter list of applications (FACET linking)

Use a FACET and set the Link options in the chart

Create a chart ([Add Widget](#)) showing throughput
of all
your services

```
SELECT count(*) FROM Transaction FACET
appName LIMIT MAX
```

The screenshot shows a 'Add widget' interface for a New Relic dashboard. The query entered is:

```
SELECT count(*) FROM Transaction FACET appName LIMIT MAX
```

The results table displays the following data:

App Name	Count
FoodMe	132 k
New Relic Pet Clinic	84.5 k
New Relic Pet Clinic 1	31 k
New Relic Pet Clinic 2	26.8 k
New Relic Pet Clinic 3	26.7 k
ecomm	104

A context menu is open on the right side of the table, with a red circle highlighting the 'Link' section. The menu includes options like 'Filter the current dashboard' and 'Filter a related dashboard'.

Use the Link options in the chart settings to:

- use [each service as an interactive filter](#) on the dashboard
- or [link to a detailed dashboard](#) of transactions, latency, errors, logs etc

1

- Find the 'LINKING' Tab,
then edit the 'Service Pie - add FACET link' chart

Patterns

Repeat a similar query: chart Billboard, Timeseries, SINCE 1 hour/day/week ago

1

Edit your dashboard > + Add Page > name it 'Test'

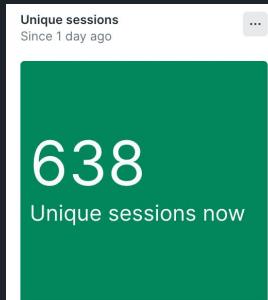
2

Create a chart showing visitors to your site

```
SELECT uniqueCount(session) as 'Visitors'
now' from PageView where appName =
'WebPortal' since 15 minutes ago
```

Use chart options: Billboard

Add a Threshold value



3

Create new charts showing visitors overtime (1 day ago/ 1 week ago)

```
SELECT uniqueCount(session) as
'Visitors' from PageView where appName =
'WebPortal' since 1 day ago TIMESERIES
```

```
SELECT uniqueCount(session) as
'Visitors' from PageView where appName =
'WebPortal' since 1 week ago TIMESERIES
```

Trends and comparing data

Visualisations & queries

Time ranges and TIMESERIES SINCE, SINCE...UNTIL, TIMESERIES

SINCE

```
SELECT ... SINCE 1 day AGO | SELECT ... SINCE yesterday | SELECT ... SINCE sunday
```

SINCE ... UNTIL

```
SELECT ... SINCE 3 days ago UNTIL 5 hours ago
```

TIMESERIES to plot over time (auto-buckets)

```
SELECT ... SINCE 3 days ago SINCE 5 hours ago TIMESERIES
```

Add a value **after** the TIMESERIES to override the auto-buckets, and set your evaluation window

```
SELECT ... SINCE 1 day AGO TIMESERIES 30 minutes
```

Add MAX after TIMESERIES to get the max no. of intervals in the time window (auto scales)

(The maximum number of TIMESERIES buckets that will be returned is 366)

```
SELECT ... SINCE 1 day AGO TIMESERIES MAX
```

Lab: Try out time spans and TIMESERIES

Try out these queries

Go to NRQL dashboard/tab and build the following charts, and query the DemotronV2 account.

1 SELECT count(*) FROM Transaction WHERE httpResponseCode = '500'
• SINCE _____
• SINCE _____ UNTIL _____

2 SELECT **average(pageRenderingDuration)** FROM PageView SINCE 12 hours ago
• TIMESERIES
• TIMESERIES 5 minutes
• TIMESERIES MAX

Adding your own values & Thresholds to charts

Use 'Customise Chart Settings' > 'Thresholds'
Or - SELECT function(attribute), value x AS 'x', value y AS 'y'

```
SELECT average(duration) , 0.1 as 'threshold' , 0.05 as 'warning' FROM Transaction  
SINCE 1 day ago TIMESERIES
```



Questions about performance...

How does my average page load duration over past 7 days compare with the 7 days before, or the same week one month ago?

SINCE ...COMPARE WITH

Can I compare the average duration of different elements of the page load time?

Multi function on event types,

Compare my average response times of 2 services in a single chart, TIMESERIES ?

Multi-query per chart

Compare performance over time SINCE...COMPARE WITH

SINCE or UNTIL timeperiod is the fixed time period for the comparison (REQUIRED)

COMPARE WITH is the time shift amount relative (before) the time specified by SINCE or UNTIL

Example: compare yesterday with the day before, or yesterday with same day one week ago

```
SELECT ... SINCE 1 day ago COMPARE WITH 1 day ago
```

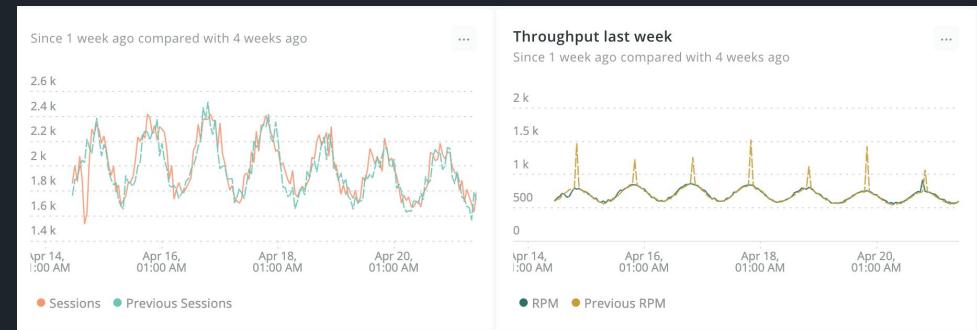
```
SELECT ... SINCE 1 day ago COMPARE WITH 1 week ago
```

Use the ... menu and View Query to explore the COMPARE WITH queries in the [Patterns dashboard](#):

1

Now try your own in your 'Test' dashboard:

```
SELECT uniqueCount(session)
FROM PageView
where appName
='WebPortal' since 1 week ago
compare with 1 week ago
timeseries 1 hour
```



Compare metrics/attributes with multi function

SELECT more than one function on an event type

Comma separate functions to create series of values/custom tables

```
SELECT average(duration) , max(duration) FROM PageView
```

Add labels ... AS 'my label',

```
SELECT average(duration) AS 'avg pageload' , FROM PageView
```

Example : Is Back end or Front end Browser Response time taking more time to complete?

```
SELECT average(backendDuration) , average(duration) FROM PageView WHERE appName = 'WebPortal'  
TIMESERIES 1 minute
```

Try out this query

1

```
SELECT average(duration ) AS 'pageload' , average(pageRenderingDuration ) AS 'page  
render' , average(backendDuration ) AS 'web app + network' FROM PageView where  
appName = 'WebPortal'
```

Compare data sets with multi-facet & facet cases

Multi-FACET

```
SELECT average(duration) from PageView facet pageUrl, countryCode, city
```

FACET CASES (labelling AS)

- ```
SELECT count(*) FROM Transaction FACET CASES (WHERE name LIKE '%cart%' AS 'cart', WHERE name LIKE '%checkout%' AS 'checkout', WHERE name LIKE '%shipping%' AS 'shipping')
```

## FACET CASES (define brackets)

```
SELECT count(*) from PageView facet cases(where backendDuration < 0.5 as '<0.5', where
backendDuration < 1 as '0.5-1', where backendDuration >= 1 as '>1')
```

# Compare data sets with multi-query / Multi-account

Add another query to double up on queries per chart!

Compare 2 services

... or compare different accounts to compare performance in staging and production

Account: Demo Prod

```
SELECT average(duration) as 'Frontend' FROM Transaction TIMESERIES WHERE appName = 'Frontend'
```

Account: Other

```
SELECT average(duration) as 'xxxxxx' FROM Transaction TIMESERIES WHERE appName = 'xxxxxxxx'
```

1

Try out this feature -

or explore the chart in your current dashboard > Visualise page



# Filter function

WHERE clause narrows your data set in the database so this happens first, before running functions.

Filter function enables you to filter on just part of the data, not the full data set.

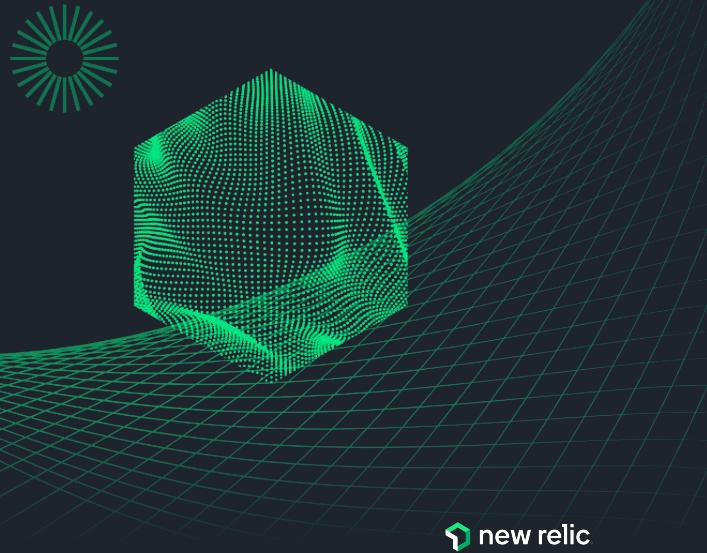
Use Filter functions when you want to:

- **SELECT more than one data set from events,**
  - **AND** may need to create conditions for them or you want to **filter on part of the data**
- 
- Example:

You want to compare 2 sets of values; average duration of all transactions, compared with the average duration of those which are part of the purchase process.
  - ```
SELECT average(duration) AS 'all',
filter(average(duration), WHERE name LIKE '%purchase%') AS 'purchases'
FROM Transaction WHERE appName = 'WebPortal'
```

Different chart types to visualize performance

Funnels, Histogram and Heatmaps



Funnel

SELECT funnel(attribute, Step A, Step B)

Example [dashboard](#):

```
SELECT funnel(session, WHERE pageUrl LIKE '%/' AS 'Homepage',
```

```
          WHERE pageUrl LIKE '%/browse/plans' AS 'Click Product',
```

Step A

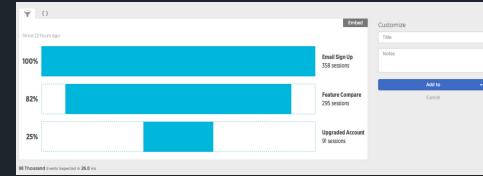
Label

```
          WHERE pageUrl LIKE '%login.jsp' AS 'Login',
```

Step B

Label

```
          WHERE pageUrl LIKE '%/checkout' AS 'Confirm')
```



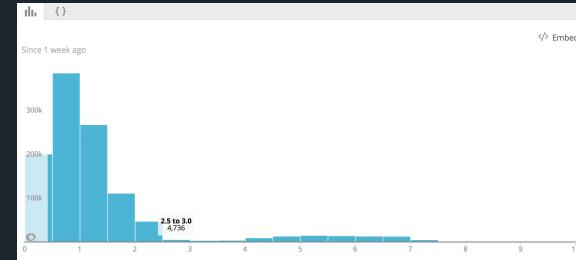
Histogram

```
SELECT histogram(attribute, ceiling , [number of buckets])  
FROM EventType
```

Example:

Show me a Histogram of page load times ranging up to 10 seconds over 20 buckets"

```
SELECT histogram(duration, 10, 20) FROM PageView SINCE 1 week ago
```



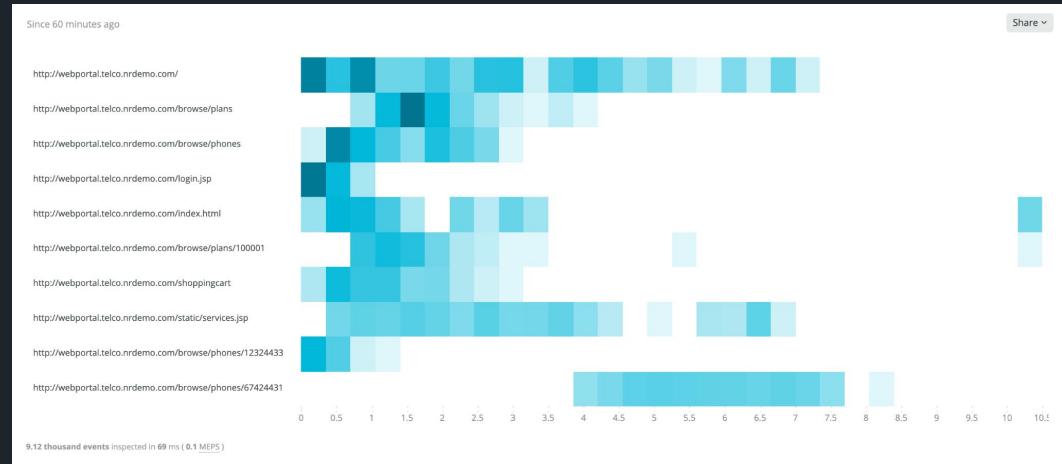
Diagnose slow pages with Histogram & Heatmap New Relic blog: [DataByte video :heatmaps-histograms](#)

Heatmap

Add FACET to Histogram

Example: Show me a heatmap of response times ranging up to 10 seconds, 20 buckets, grouped by pageUrl

```
SELECT histogram(duration,buckets: 30,width: 10) from PageView facet pageUrl
```



Lab: Create a histogram and heatmap

- 1 Create a chart with a Histogram of pageload times (PageView) ranging up to 10 seconds with 30 buckets
- 2 Turn this into a heatmap of pageload times for different urls by adding **Facet pageUrl**
- 3 Explore the **Funnel chart** in your current dashboard > Visualise page

Customise widgets

Examples: **y-axis, number/time formats, ignore timepicker**

Data format: **attribute, number, decimals, 2**

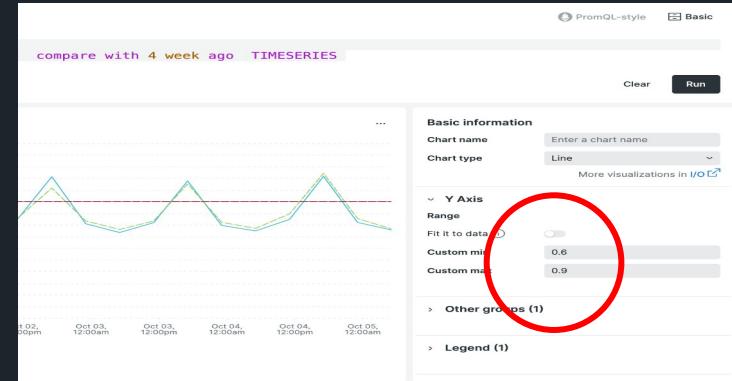
```
SELECT average(duration) from Transaction  
where appName='WebPortal' AND name like  
'%browse%' since 1 week ago
```

go to Data Format - Av duration - number - decimals 2

Y-axis: (add TIMESERIES) it to range OR edit min max values

```
SELECT average(duration) from Transaction  
where appName='WebPortal' AND name like  
'%browse%' since 1 week ago TIMESERIES
```

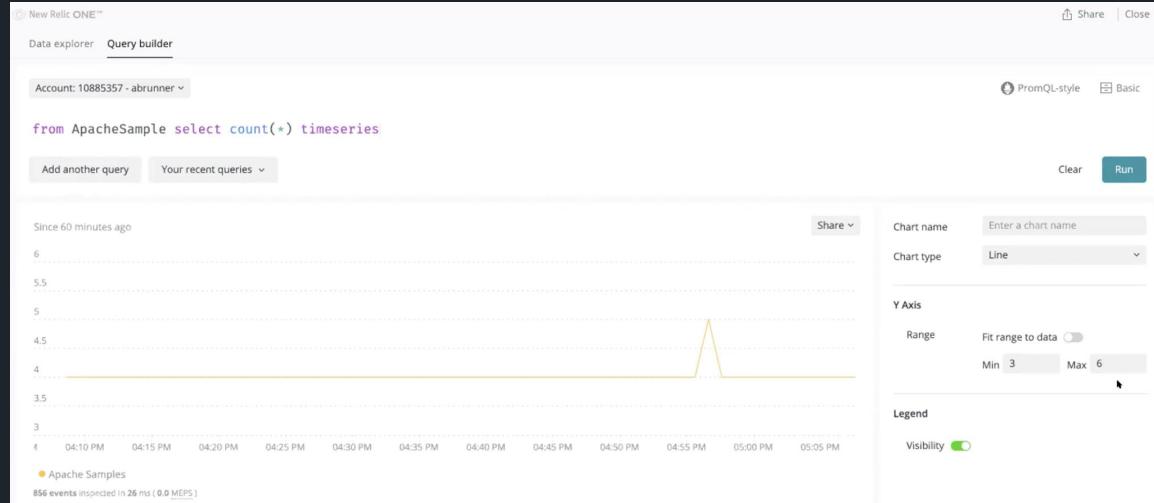
Dashboard options: **ignore timepicker (fixed query)**



Customise widgets

Fit to range, customise range

1



Use this query to create a line chart - adjust the min max range

```
SELECT average(cpuPercent) FROM SystemSample TIMESERIES
```

Custom Visualizations

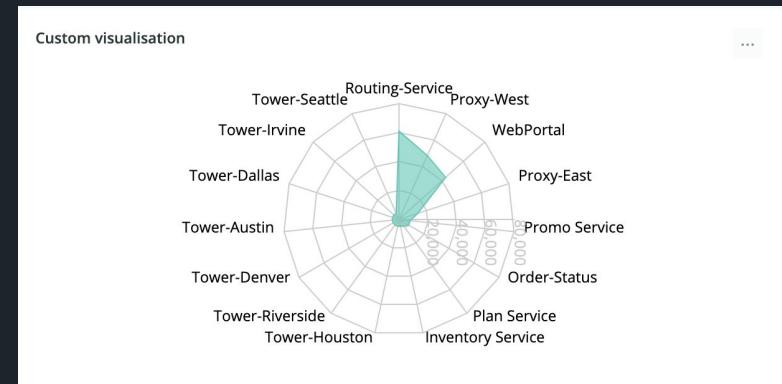
Visualisations & queries

Custom visualisations

FACET Treemap and FACET Chart - eg Where are my customers from?

- 1 Go to Apps > Custom Visualisations:
Try out the FACET Treemap and FACET Chart with this query below, or the query example provided in the chart settings

```
SELECT count(*) FROM PageView  FACET city LIMIT MAX WHERE city !=  'San
Jose' AND city IS NOT NULL
```



Custom visualizations

Pick from the Instant Observability catalog or Custom Viz app
Customise them, or create your own

Steps on how to add custom visualizations to your dashboards:

<https://developer.newrelic.com/build-apps/add-visualizations-to-dashboard>

Check out the range of Victory Charts out-of-the box Custom Visualisations here:

[NerdByte - Victory Charts](#)

If you're familiar with React or building NerdPacks, check out how to build your own custom viz here:

<https://developer.newrelic.com/build-apps/build-visualization>

Or new to NerdPacks? Get started building apps here: <https://developer.newrelic.com/build-apps>

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Config, API, Templates

Quickstart templates, CRUD API,

Config, import, API

Sharing and setting up access on dashboards

API: Full C R U D

Dashboards are entity based - use the GUID in the API calls, or mutations in GraphQL API

Learn more here:

<https://docs.newrelic.com/docs/query-your-data/explore-query-data/dashboards/dashboards-api/>

More resources

1

NRQL: Joins, Lookup, GeolP

[Databyte video](#)

3

Custom Visualisation: Line and Bar Charts

[Databyte video](#)

4

Dashboard - Template Variables

[Databyte video part 1](#)

[Databyte video part 2](#)

2

Charts feature: Connected data sets

[Databyte video](#)

Takeaway lab: Challenge yourself!

Add some of these useful charts. use DemotronV2 account and WebPortal application:

1 Count only http 500 errors from your Transaction event type and group by transaction name and transactionSubType

2 SELECT the following function(attribute) and label from the PageView event to find out how many visitors are on my site right now?
(use SINCE 5 minutes ago)

```
uniqueCount(session) AS 'Site  
Visitors'
```

3 You have added a **custom attribute** to your Transaction event type in the WebPortal app to store shopping cart total value called PurchasedCartGrandTotal

SELECT the total shopping cart value using the function(attribute):

```
sum(PurchasedCartGrandTotal)
```

Survey

We'd love to hear what you think!

<https://nru.to/adv-dashboards-survey>

If you'd like help with NRQL or Dashboards please reach out to us by selecting
'Request Demo' in the link at the end of the Webinar - Thanks!

Thank you



Liam Hurrell
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Keep learning at
learn.newrelic.com