Qlik Design Blog : Year-over-Year Comparisons

Posted by Henric Cronström Mar 4, 2014

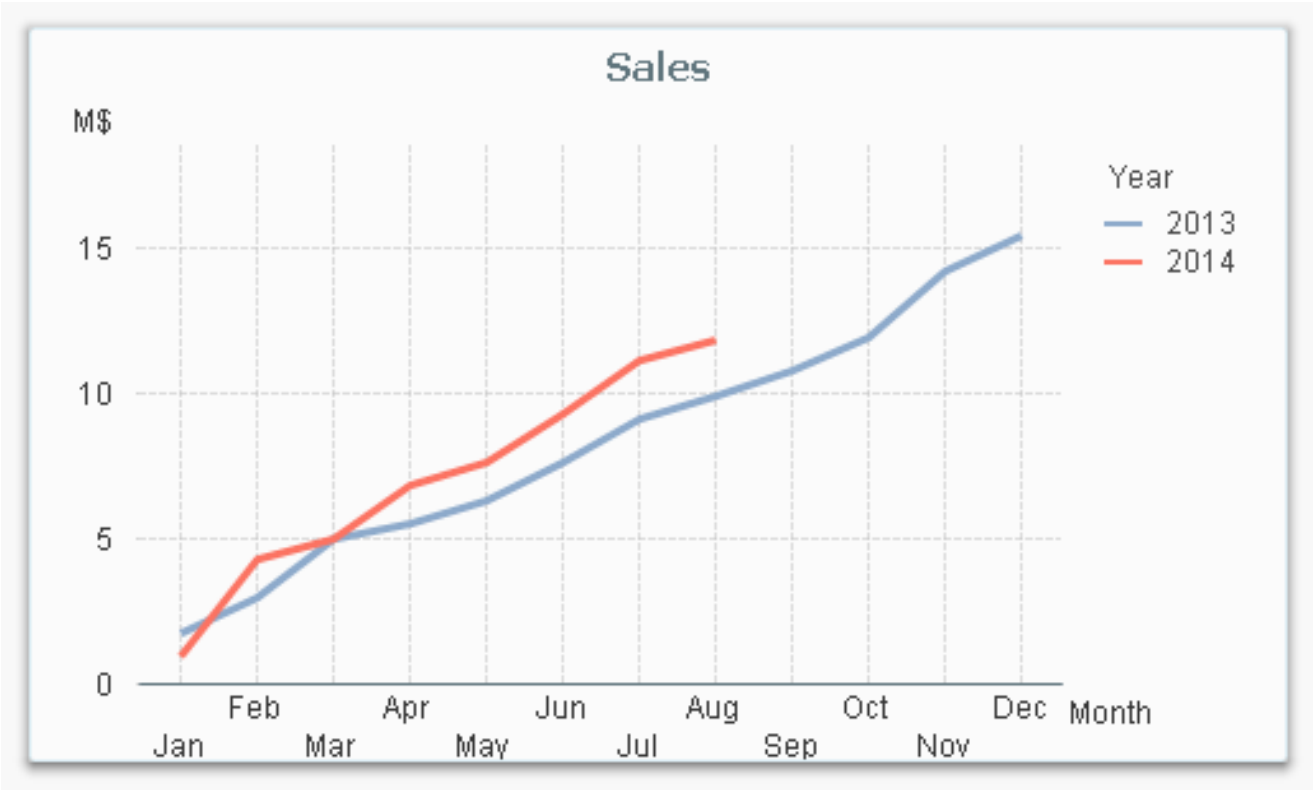
A number alone doesn't tell you very much – you need to compare it with something. And very often you want to compare this year's number with last year's.

It is called Year-over-Year (YoY).

In such a comparison, you can for example compare the sales of the current month with the sales for the same month last year. Or – if you want to avoid fluctuations due to good or bad months, you instead look at the accumulated sales in the current year compared the same period last year. You look at the Year-to-Date (YTD) number.

But how do you calculate it? How do you write a simple formula that picks out a subset of transactions from last year and compares them to the corresponding transactions from the current year?

If you have Month as dimension and show accumulated numbers in the chart, you don't need to do anything. The numbers are comparable as they are.



However, if you don't use Month as dimension, the numbers will no longer be comparable since last year contains transactions from a longer period. You still may want to make the comparison, but with another first dimension and Year as the second.

There are several ways to do this, and they differ in how the reference date is defined. One way is to let the user define an arbitrary reference date – either through a selection or through a variable – and then use this is an advanced Set Analysis expression.

Another, much simpler way is to use the date of the script run as reference date. If your application is refreshed every night, this would mean that the Year-to-Date calculation always is up until today's date.

Here's how you do it:

In your Master Calendar you should define flags – Boolean fields – that define whether or not a specific date should be included in the calculation:

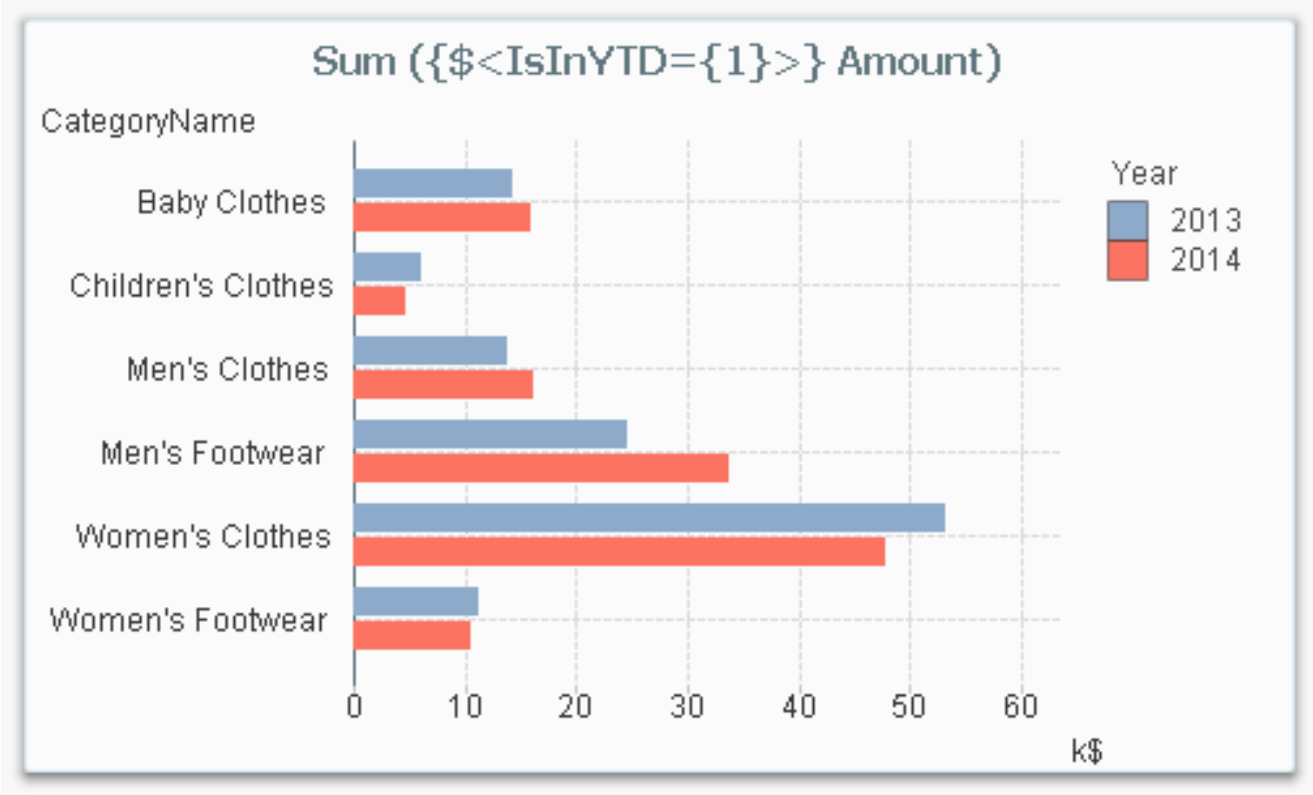
```
If( DayNumberOfYear(Date) <= DayNumberOfYear(Today()), 1, 0 ) as IsInYTD,
```

The above formula tests whether the date falls before today's date or not. Note that this flag will be useful also for dates belonging to other years than the current. The value of the flag will be 1 for dates in the beginning of the year irrespective of which year it is.

Then you can use this flag in a simple Set Analysis expression:

```
Sum( {$<IsInYTD={1}>} Amount )
```

The Set Analysis expression will pick out the correct dates and thus the correct transactions for the comparison. Further, this expression can be combined with any dimensions.



Flags for a number of different time periods can be created like this, not just Year-to-Date, but also Quarter-to-Date, Month-to-Date, Current Month, Last Month, etc.

```
If( DayNumberOfQuarter(Date) <= DayNumberOfQuarter(Today()), 1, 0) as IsInQTD,
If( Day(Date) <= Day(Today()), 1, 0) as IsInMTD,
If( Month(Date) = Month(Today()), 1, 0) as IsCurrentMonth,
If( Month(AddMonths(Date,1)) = Month(Today()), 1, 0) as IsLastMonth,
```

Summary: Create the necessary flags in your Master Calendar. It will simplify your Set Analysis expressions tremendously.

HIC
27348 Views Tags: year_to_date, ytd, master_calendar, yoy, flag, year_over_year


Henric Cronström *in response to Steve Dark on page 4*
Jun 30, 2015 7:18 AM
I thought it was quite clever to turn the two dimensions around, to use Month as first dim and Year as second ...

... but you're right that there is nothing advanced with this chart:

Dim1: Month
Dim2: Year
Measure: Sum(Sales)
Accumulation: Full

And that's it!

HIC

 Steve Dark *in response to Sajid Mahmood on page 4*
Jun 30, 2015 5:47 AM
Hi Sajid,

There is nothing clever going on with this chart. The expression would simply be **sum(Sales)** the trick is having two separate dimensions, rather than a single Month Year one. As you can see from the image both **Year** and **Month** are dimensions on the chart. You just need to promote one to get them the right way around.

If you only have a date, or month/year, field in your source data the Month and date can be obtained in the load script like this:

Year(DateField) as Year,
Month(DateField) as Month,

Alternatively, it is common practice to have a calendar script for these date breakdowns. If you Google you will find lots of examples of these.

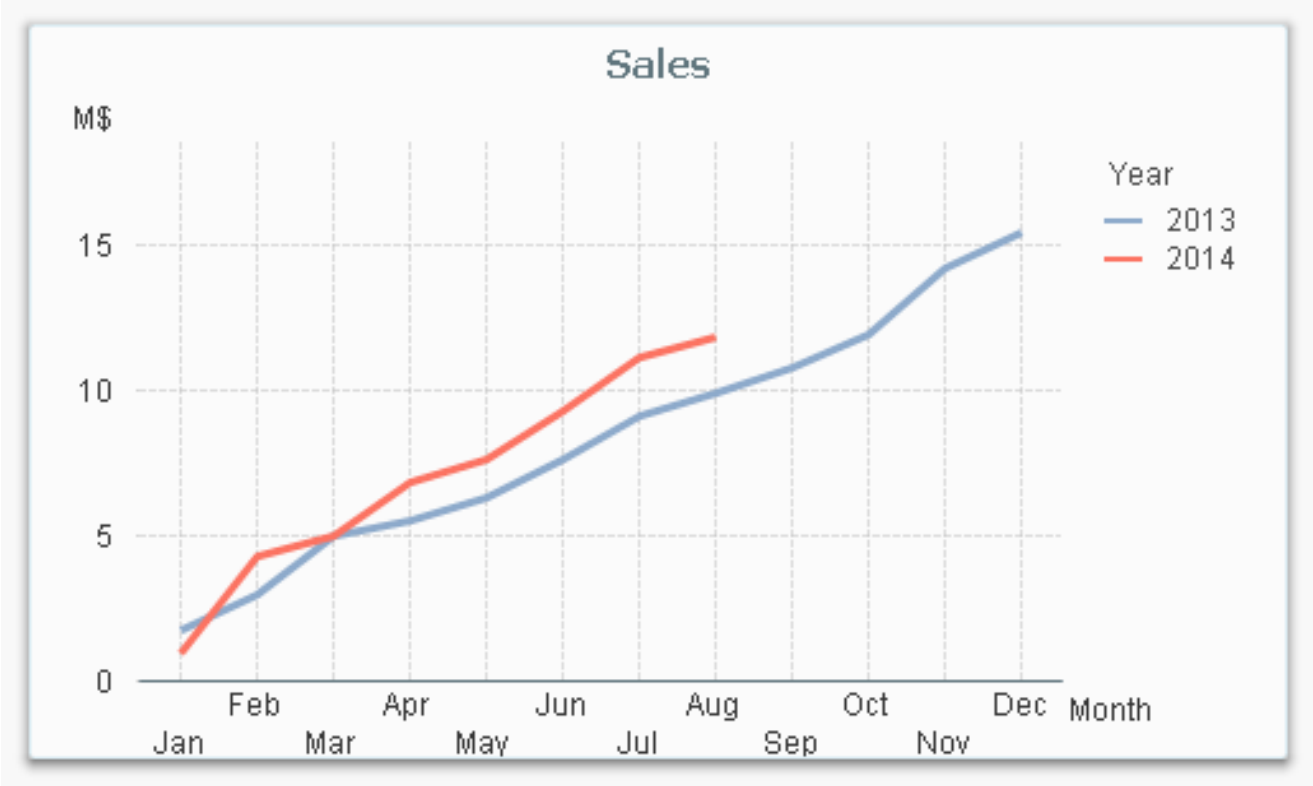
Hope that helps.

Steve

 Sajid Mahmood *in response to Steve Dark on page 5*
Jun 30, 2015 5:26 AM

Hi HIC,

Can you please send me the qvw sample file showing the below chart format and expressions used.
Many thanks for your quick response.



Regards
Sajid


Steve Dark *in response to Clare Sim on page 5*
May 28, 2015 6:57 AM
Hi Clare,

Not knowing the content of your variables I can't say for sure what is going on here.

You may have a problem in that MONTH is only 1 to 12, rather than a continuous value, so unless you have code in the expression you will hit a problem - all previous years will go transparent at the current month also.

If you want to get a fully sequential month number you can do **year(Date) * 12) + month(Date) as MonthID,**

Not having MONTH in an aggregation may also be an issue, unless you have it as a dimension? Even then I tend to use the Only function - to remind myself why I am not aggregating.

Steve


Clare Sim *in response to Steve Dark on page 6*

May 28, 2015 12:14 AM
Hi Steve, I tried the following:

=

IF(($(vLES_Count)=0), $(vGreen),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)>.8), $(vRed),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)=.8), $(vAmber),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)<.8), $(vAmber),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)=.5), $(vGreen),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)<.5), $(vGreen),
null())
)))))
Without accumulation, but it did not work out.

I used this previously:

=
IF(([MONTH]>$(vCurrentMonthNum)), argb(0,0,0,0),
IF(($(vLES_Count)=0), $(vGreen),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)>.8), $(vRed),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)=.8), $(vAmber),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)<.8), $(vAmber),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)=.5), $(vGreen),
IF(($(vLES_Count)/$(vLES_Count_PY_YTD)<.5), $(vGreen),
$(vRed)
)))))

It worked for some parts, but when I change my selection, it didn't work for some too.
I'm not sure where I have gone wrong..

 Clare Sim *in response to Henric Cronström on page 7*
May 28, 2015 12:08 AM
Thanks, Henric. It is no wonder when I tried using the rangecount formula without the accumulation function, it still did not work. How should I exclude them, then?

 Steve Dark *in response to Henric Cronström on page 7*
May 26, 2015 6:58 AM
When I come up against this I change the colour of the line when the value is zero. You can remove the line completely if you like (with argb) - but I find a pale colour showing where the plateau is reached is more useful.

To do this click on the plus next the expression and enter in a colour expression. It will need to be something like:

=if([Your Expression] = 0, rgb(180,180,255), null())

The null is not essential (as it is the default for if), but it reminds me I am not specifying a colour for the parts of the line with a value.

The downside of this approach is that is also affects the cell colour if you fast change to a table view.

Hope that helps.

Steve

 Vikas Mahajan
May 26, 2015 6:58 AM
Good Post Thanks for Sharing Only one doubt suppose I am checking FEB-2014 vs. FEB-13 and FEB-13 ending date is suppose 29 then whether it will compare 28 with 29 ?

Vikas

 Henric Cronström *in response to Clare Sim on page 7*
May 26, 2015 6:47 AM
I just used "Full accumulation".

If the line continues until Dec, it probably means that these months are *logically possible* (not excluded), but lack values.

HIC

 Clare Sim
May 25, 2015 10:55 AM
Hi, following your very first graph posted, I was wondering how did you manage to stop the accumulated line graph to current's month? I've a graph where the values populate as at April but the line is dragged till Dec.

Appreciate your assistance.

 tyagishaila
Dec 16, 2014 10:46 PM

Hi Henric
Its very useful and simple method for sales analysis.

 Suresh Babu
Nov 26, 2014 1:41 AM
Hi nice post

 Henric Cronström *in response to Jeremaine Johnson on page 8*
Nov 25, 2014 9:11 AM
Then you would need a slightly more complex Set Analysis expression. You could for instance define a

```
DayNumberOfYear( Date ) as DayInYear
```

and then use

```
Sum({$<Year=,Month=,DayInYear={"<=$(=Max(DayInYear))"}>} Value)
```

as expression.

See also this example by stevedark:
QlikView App: Simple Year To Date Example (Set Analysis)

HIC

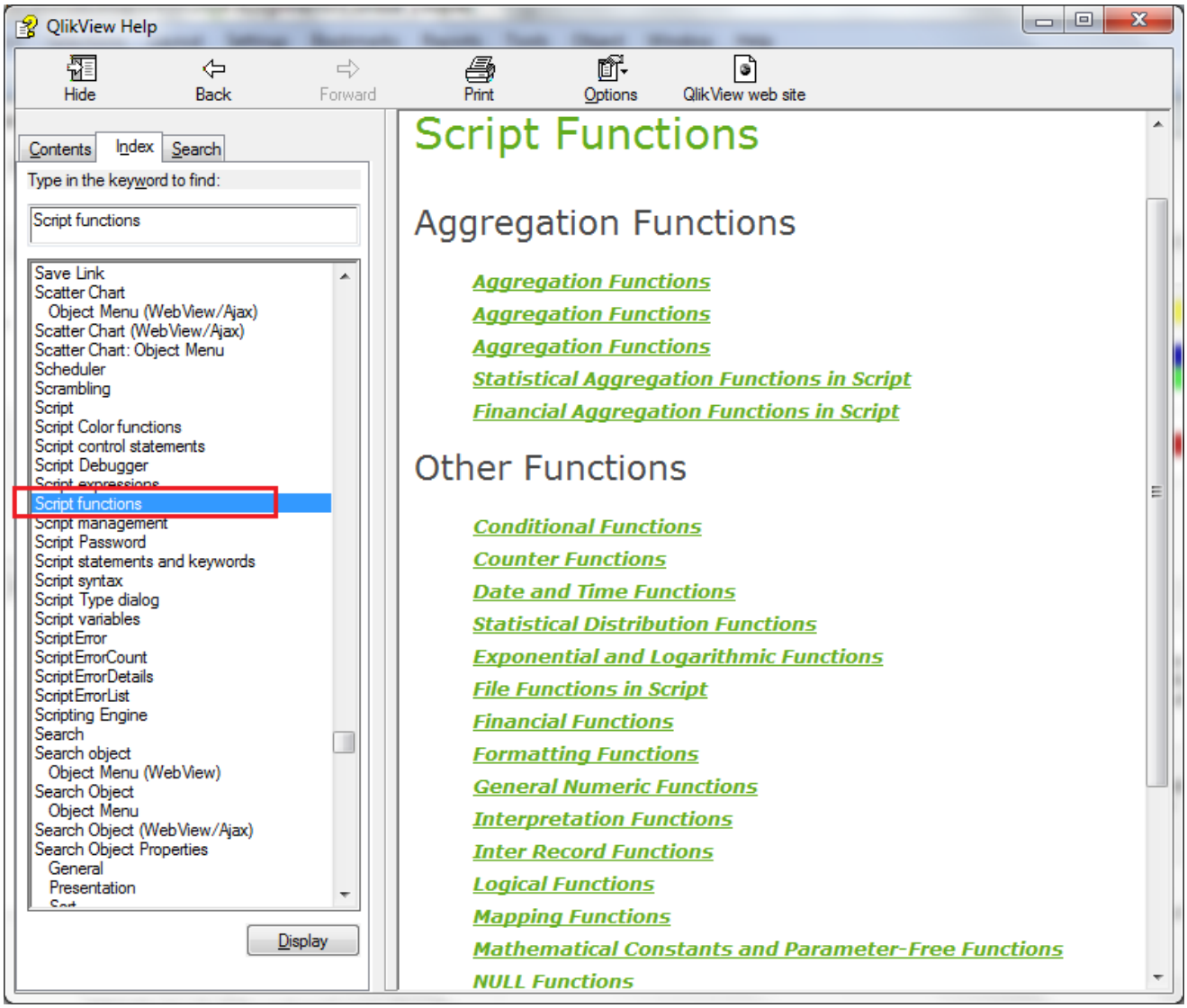
 Jeremaine Johnson
Nov 24, 2014 12:14 PM
Great!
How do you show year-over-year and month-over-month as expressions based on selected year and multiple months?
Thank you.

 Suresh Babu
Nov 3, 2014 2:32 AM
very good post

 Jarrell Dunson
Oct 30, 2014 10:08 AM
Henric, what about a leap years...where we want to count the Feb 29th from previous year as IsInYTD...

```
if( (month(Date)=2) and (day(Date)=29) and (month(Today())=2) and (day(Today())=28),
  1,
  If( DayNumberOfYear(Date) <= DayNumberOfYear(Today()), 1, 0 )
) as IsInYTD
```

 Sudeep Mahapatra *in response to James Olut on page 10*
May 21, 2014 7:09 AM
James ! Have you checked the QlikView help already. Given below is a screenshot. I think this page may help you.



 Henric Cronström *in response to Shoaib Ahmed on page 9*
May 20, 2014 2:37 PM
No.

 Shoaib Ahmed

May 20, 2014 2:26 PM
Can set analysis be used in load script?

 Henric Cronström *in response to James Olut on page 10*
May 20, 2014 1:36 PM
I haven't counted, but my guess is that over 95% of the functions can be used *both* in the script and in the UI. There is no simple answer - you will have to look in the help. For chart inter-record functions it says "These functions can only be used in chart expressions."

HIC

 James Olut
May 20, 2014 11:36 AM
Thanks HIC brilliant blog.

My question is how would developers know which function can use in the script and which function can not be use in UI?
For example **Top** function can be use in UI but not in script. There's probably more like that.
Hope my question make sense.

Thanks

 Henric Cronström *in response to Stacey Vitale on page 10*
May 12, 2014 4:06 PM
If you use month as dimension, then of course QlikView splits up the numbers per month, unless you enable the Accumulation in the chart (expression tab).

I suggest you open a thread of its own and post your app. It will be a lot easier for us to help you if we can look at the data.

HIC

 Stacey Vitale
May 12, 2014 3:48 PM
For example, lets say I have 'number of injuries' and 'manhours' as data points. The 'Total Injury Rate' equation in my expression is (number of injuries * 200,000)/manhours so I am using this set analysis equation (discussed previously in the thread) in my expression for the year 2014.

=num((sum(

```
{<
IsInYTD = {1}, Year_Metrics = {2014}
>}
Month_TRI)
*200000)
/
sum(
{<
IsInYTD = {1}, Year_Metrics = {2014}
>}
Month_Manhours)
,'###,###.00')
```

However it seems to keep calculating the 'Total Injury Rates' individually by month instead of YTD at each month.

 Henric Cronström *in response to Stacey Vitale on page 11*
May 12, 2014 3:37 PM
Is 'Apr 2011' right-aligned? If so, then you *have* a serial number "hidden" behind this text. Every date has *both* a number and a text - and it is the text that is displayed, and the number that is used for sorting and calculations.

Read more about QlikView's dual data type here:
http://community.qlik.com/blogs/qlikviewdesignblog/2012/11/13/dual
http://community.qlik.com/blogs/qlikviewdesignblog/2012/06/07/get-the-dates-right

HIC

 Stacey Vitale *in response to Henric Cronström on page 11*
May 12, 2014 3:25 PM
When I put that into my script, it still brings back ‘Apr 2011’, not a serial number. I am new to QlikView so sorry if my questions seem simple. #

 Henric Cronström *in response to Stacey Vitale on page 12*
May 12, 2014 3:15 PM
There is really no principal difference from if you have dates. I would load the months like dates and format them as months, e.g.

Date(Date#([Month-Year], 'MMM YYYY'), 'MMM YYYY'), as [Month-Year]
and then you would have them as a correct date serial number (1st day of month) but formatted as Month-Year, and you could do pretty much everything as you do with dates.

HIC

 Stacey Vitale
May 12, 2014 2:07 PM
What if my data is based on Month-Year, not a specific date? So an example data point is Apr 2011 or Apr 2012. How do I create a year over year comparison for YTD data by month? So the bar chart would have 2011 data; the first data point would be YTD performance as of January, then YTD as of February and on through December compared to YTD for each month in 2012, 2013, and 2014 the same way.

 Steve Dark *in response to Shoaib Ahmed on page 12*
Apr 5, 2014 5:08 PM
Hi Shoaib,

I've responded to this question over on this thread: http://community.qlik.com/docs/DOC-4313

Cheers,
Steve

 Shoaib Ahmed
Apr 4, 2014 4:34 PM
hic

Hi,

Can you please advise how to get last five years YTD sum on bar chart, where the dimension is year. The problem is if I select month, then it is giving correct YTD for the last max year only and then full year sum for the last years when using 2nd formulas as below.
I am using two formulas:
1) To get last five years sum
Sum({$<Year={">=$(=Max(Year)-4)<=$(=Max(Year))"}>} Sales Amount)

2) Then to get YTD, I modified above formula as:

Sum({$<Year={">=$(=Max(Year)-4)<=$(=Max(Year))"},Month=,Quarter=,Date={"<=
$(=MonthEnd(max(Date)))"} Sales Amount)

Thanks in advance!

BR,
SAK

 Debbie Pyykkonen
Mar 16, 2014 1:07 PM
I like these flags in the Master Calendar, however, they do limit you to YOY comparison for only current year and last year because they are static. I prefer to use a dynamic option such as max() or addyears() in the application so when the user selects a given year, the previous year is added as comparison or multiple years can be compared.

 Paul Yeo
Mar 7, 2014 2:11 AM
Hi HIC

Thank you for every month you are able to give us a big surprise. as every month i have sales meeting , and i am able use those new technique i learn from you to present my data , so the meeting is not so boring.

As usual i try to implement , but my chart for both 2013 and 2014 stop at march month. i see your chart for previous year is able to plot from jan till dec. where did i go wrong ?

Re: Chart not able to display till Dec for YOY compare from HIC on recent blog post

Paul

 renju K
Mar 6, 2014 6:25 AM
Good as always!

 Brice SACCUCCI *in response to Peter Cammaert on page 14*
Mar 6, 2014 6:03 AM
Hi Peter,

I'm working on this. Please wait a little bit so that I can post something. This can be tricky to correctly apply because using the wrong selections on the "technical" fields can lead to unexpected results!

 Sudeep Mahapatra

Mar 5, 2014 7:49 AM
Hi Henric, Thanks a lot for such a nice post. It is useful to most of us as YOY is a very common requirement in dashboard development.

 Rajah Ghadache
Mar 5, 2014 6:32 AM
Hi Henric,
Very interesting article. I am currently having difficulties achieving a periodic analysis. Would you / anyone else be able to take a look at my thread: http://community.qlik.com/thread/109539
Many thanks!

 Abhijit Bansode
Mar 5, 2014 6:27 AM
Very good alternative to work with dates.
Perhaps, Candidate for implementation in my next assignment.
Thank you Henric.

 Peter Cammaert *in response to Brice SACCUCCI on page 16*
Mar 5, 2014 5:39 AM
Hi Brice, I would be very much interested in the full history demo application of your colleague. Sounds like it would solve the overlapping expressions problem in a year-month graph, using a LinkTable technique that sounds similar to the one I used in a pivot table P&L

 Per Hemström
Mar 5, 2014 5:03 AM
Do you also set accumulation to "Full accumulation" or how do I get the accumulated numbers?
If so I get the problem with the accumulation just becoming a straight line beyond current month.

 Himank Luthra
Mar 5, 2014 12:53 AM
Nice Post HIC

 My QV
Mar 4, 2014 12:42 PM
I was trying to implement this once in my application but realized that in our apps if user selects 2013 YTD should be for 2013 and PYTD for 2012 not 2014 and 2013. then i decided to with sets only.

 Brice SACCUCCI *in response to Henric Cronström on page 15*
Mar 4, 2014 11:26 AM
Yes Henric, you're right. Each solution has its advantages and drawbacks. I guess it depends on what the business/user needs are, as usual : have the Year as a dimension, or not.
If you have 10 years of data, this can clutter the Chart and you would have to create a new dimension containing the current year and the previous one or go back to the 2-expressions solution.

In the whole picture, the intermediate Calendar-Link-Table is more evolved than what I exposed and is used to do more stuff. For instance, be able to chose between cumulative/single amounts and/or deal with different fact granularities (as you do in your Generic Keys whitepaper).

 Carlos Alberto Reyes Díaz
Mar 4, 2014 10:51 AM
Very interesting alternative, I always use Set Analysis based on the Max Date selected or possible, but this option allows to compare non continuous years.

 Nicholas Mustacich
Mar 4, 2014 10:02 AM
Henric,
What is the simplest script solution for calculating Last Closed Period for current year.

Thanks
Nick

 Michael Solomovich *in response to Henric Cronström on page 15*
Mar 4, 2014 9:10 AM
I use the same method as baa
It has one essential advantage - the variable vCurrentDate (I prefer to call it vKPIDate) can be set to any date, which allows YoY and other "Period over Period" comparison using any date as a base date.
Yes, it means there is separate expression for each year. Well, in my case it worth the effort...

Regards,
Michael

 Henric Cronström *in response to Brice SACCUCCI on page 16*
Mar 4, 2014 8:14 AM
@ baa

I haven't seen the entire solution, but I get the picture. The flags that you list will work also, but there is one major difference: Your flags can only be used for *one year at the time*.

So, if you want to compare last year with current year, *you must make two expressions*. Whereas with my flags, *I can choose* if I want one common expression:

```
Sum( {$<IsInYTD={1}>} Amount )
```

or two separate, one per year:

```
Sum( {$<IsInYTD={1}, <IsLastYear={1}>} Amount )
Sum( {$<IsInYTD={1}, <IsCurrentYear={1}>} Amount )
```

HIC

 Henric Cronström *in response to Martin Pohl on page 17*
Mar 4, 2014 7:57 AM
@ MartinPohl
The Sum(Amount*IsInYTD) will work - in principle.

It is however slower than Sum({$<IsInYTD={1}>} Amount). And further, the same construction cannot be used for other aggregation functions, such as Count() and Avg(). Better then to use Set analysis which is fast and you can use in any aggregation function.

HIC

 James Summerson
Mar 4, 2014 6:31 AM
Nice post. I've been using something simlar combined with heat maps to get user/server info into a dashboard.

 Márcio Rodrigo Campestrini
Mar 4, 2014 5:37 AM
Very good post. Thanks.

 Brice SACCUCCI
Mar 4, 2014 5:28 AM
Hi hic,

I usually use other functions:

```
if(InYearToDate(Date, $(vCurrentDate), 0), 1, 0)        AS [Cal IsInYTD],
```

if(InYearToDate(Date, $(vCurrentDate), -1), 1, 0)	AS [Cal IsInLastYTD]
if(InQuarterToDate(Date, $(vCurrentDate), 0), 1, 0)	AS [Cal IsInQTD]
if(InQuarterToDate(Date, $(vCurrentDate), -1), 1, 0)	AS [Cal IsInLastQTD]

Are there any difference in behaviour using this instead of your formulas?

Another point, this solution does not allow to use Year-Month as a dimension and show a full history. My colleague lft adressed this by creating a Calendar-Link-Table between the Master Calendar and the Facts. The expressions become something like Sum({<[Date Type] = {'YTD'}, [Year Shift] = {-1}> Sales}

His solution is quite complex to write down but he has a demo app if you are interested

 Valerio Fatatis
Mar 4, 2014 4:24 AM
Very good Henric... introduce in my work.

 Steve Dark
Mar 4, 2014 3:44 AM
Thanks Henric - another post that is sure to be useful for people, Year on Year comparison is something I see people requesting help with a lot on the Community.

I have uploaded a couple of prior period examples in the past, including this one:
QlikView App: Set Analysis - Prior Period Comparison

 Martin Pohl
Mar 4, 2014 3:38 AM
Hello HIC,
how about the idea to change your formula
Sum({$<IsInYTD={1}>} Amount)
to
Sum(Amount*IsInYTD)
In cases that IsInYTD is 1 the Amount is multiplicated with 1 and is the value itself, on the other case it is multiplicated with 0 and is 0.
What is the high-performance formula?
Regards

 Manish Kachhia
Mar 4, 2014 2:11 AM

Nice post, will try to implement today in my current apps.

 Kalyana Sundaram
Mar 4, 2014 1:40 AM
hi HIC,

really superb discussion.