

An astronaut in a white space suit is shown from the side, floating in space against a starry background. The astronaut's helmet is reflective, and various equipment is visible on the suit. The overall scene is set against a dark blue and black space backdrop with numerous white stars.

LEAD WITH CURIOUSITY

QlikView Document
Performance Tuning Using
Document Analyzer

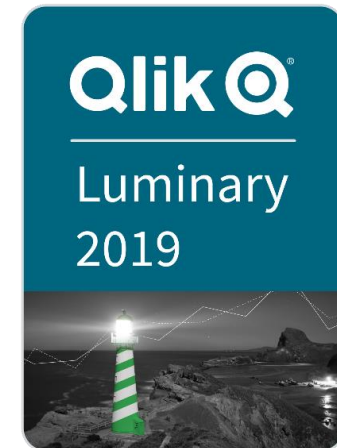
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Qlik  | Community MVP



Masters Summit
for Qlik

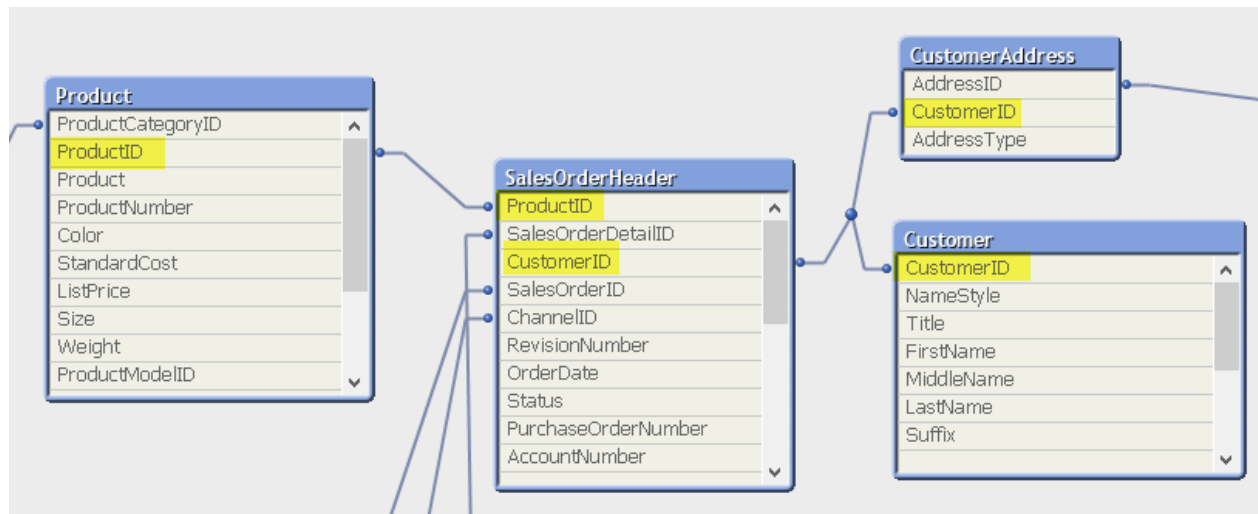


Which is Faster?

Count the number of Customers who have purchased more than one Product:

1) `Count (Distinct {<CustomerID={ "=Count (Distinct ProductID) >1" } >} CustomerID)`

2) `Sum (aggr (Count (Distinct ProductID) , CustomerID) >1)`



Session Overview

- Session Goal: Learn to use the QlikView Document Analyzer tool to measure and improve the performance of your QlikView Document.
- Agenda
 - Document Analyzer
 - A tuning approach
 - Server sizing using DA Compare Tool

Define Performance

- Response time after a click
 - What is fast and what is slow? – depends who you ask.

- Utilization of hardware
 - Cost of purchase, upgrade and management.

- Reload Time
 - Not discussed today...

What is Document Analyzer?

- What it is:
 - An application profiling tool
 - Helps you understand the usage of Fields, Expressions, Groups, Triggers, Variables in a QVW
 - Reports the calc time and memory usage of sheet objects
 - Meant to guide experienced developers
 - Download from <http://qlikviewcookbook.com/tools/>
- What can you use it for?
 - Performance Tuning
 - Evaluating and validating standards

What is Document Analyzer Not?

Not a “wizard,” it’s a tool



≠



DA Distribution Bundle

- **DocumentAnalyzer_Vnn.qvw** – Document Analyzer (DA) itself.
- **DaCompareTool_Vnn.qvw** – A tool for comparing the results of different DA runs.
- **DABatch.txt** – a command file (rename to .cmd) to run DA analysis in batch against a set of QVWs.
- I usually remove the “_Vnn” from the names after extracting. It makes it easier for the tools to find each other.



DABatch.txt



DaCompareTool_V1.2.qvw



DocumentAnalyzer getting started.pdf



DocumentAnalyzer_V3.8.qvw

QlikView® Document Analyzer

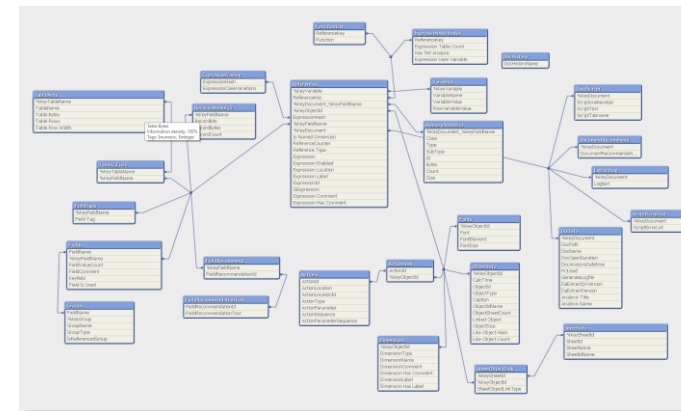
QlikView Document Analyzer is a QVW that uses a VBScript module to extract metadata from the target document.

The extracted metadata is stored in a set of csv files.

The csv files are loaded and manipulated by script to create a data model for analysis.

Analysis is done with standard QV sheet objects and expressions.

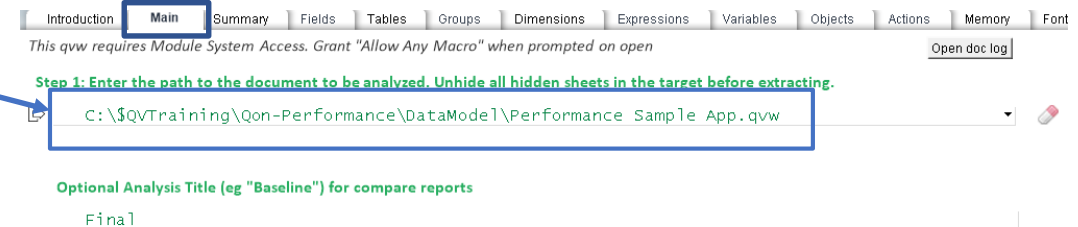
- Nothing to install, it's just a QVW
- Download from <http://qlikviewcookbook.com/tools/>
- Allow “all macros” on first open



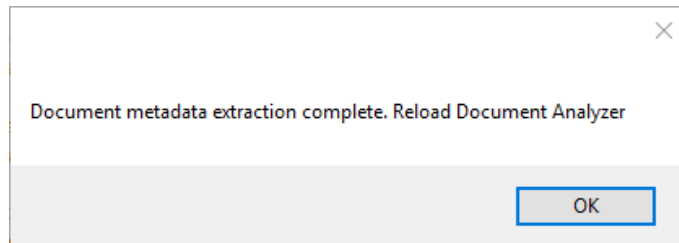
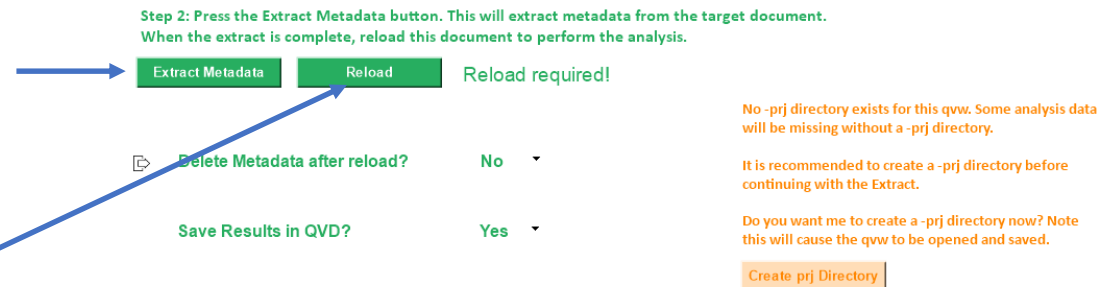
Introduction Main Summary Fields Tables Groups Dimensions Expressions Variables Objects Actions Memory Fonts Recommendations											
Analyzing: Performance Sample App SA, 2017-10-05 6:11:56 PM "Baseline"											
Fields	Tables	Sheets	Groups	Dimensions	Expressions	Variables	Objects	Actions	Memory	Fonts	
81/81	13/13	19/19	0/0	27/27	56/56	2/2	69/69	2/2	18,798/1		
Field References											
FieldName	Field Is Used	Key Field	Calculated Dimension	Named Dimension	Referenced Group	Expression	Variable	Action	Macro	Alert	Reference Count
SalesOrderDetailID	Y	Y		56		74	4				134
Comment	N	Y									0
SalesOrderID	Y	Y				1					1
SalesOrderNumber	Y	Y		2		2					4
ShipTime	Y	Y		1							1
ProductID	Y	Y				2					2
CustomerID	Y	Y				2					2
OrderDate	Y	Y		1							1
LineTotal	Y	Y				29	1				30
LinePrice	Y	Y		1							1
AccountNumber	N	Y									0
PurchaseOrderNumber	N	Y									0
ShipToAddressID	N	Y									0
TotalDue	N	Y									0
BITToAddressID	N	Y									0
SubTotal	N	Y									0
TaxAmt	Y	Y									2
Freight	N	Y				1	1				0
OrderQty	Y	Y				5					5
OrderPrice	Y	Y									1
OrderQty	Y	Y		1							1
ChannelID	Y	Y									0
Date	Y	Y				1					0
RevisionNumber	N	Y									0
Status	N	Y									0
ShipDate	Y	Y		1							1

Executing QV Document Analyzer

1. Enter path of target QVW to be analyzed.



2. Click “Extract Metadata” and let the extract proceed. Keep your hands off the keys.



3. Click “Reload” after extract complete.

QV Document Analyzer Options

- Options are set on the Main sheet.
- Hover over an option to get a tooltip explanation.
- Two options are required for the DA Compare Tool:
 - “Optional Analysis Title”
 - “Save Results in QVD” = Yes

The screenshot shows the QV Document Analyzer interface. The 'Main' sheet is selected in the top navigation bar. The interface includes a menu bar with options like Introduction, Main, Summary, Fields, Tables, Groups, Dimensions, Expressions, Variables, Objects, Actions, Memory, and Font. Below the menu bar, there is a warning message: 'This qvw requires Module System Access. Grant "Allow Any Macro" when prompted on open' and an 'Open doc log' button. The main area contains two steps: 'Step 1: Enter the path to the document to be analyzed. Unhide all hidden sheets in the target before extracting.' and 'Step 2: Press the Extract Metadata button. This will extract metadata from the target document. When the extract is complete, reload this document to perform the analysis.' There are buttons for 'Extract Metadata', 'Reload', and 'Reload required!'. A 'Delete Metadata' button has a tooltip explaining that the Extract process creates a metadata folder for each extract, and if this option is set to No, the folder will be deleted after reload. A 'Save Results in QVD?' dropdown menu is set to 'Yes'. A 'Create prj Directory' button is also visible.

General UI Notes

- Selection navigation as you would expect – listboxes, charts, etc.
- Green ribbon on all sheets reflect current selections

Analyzing: HR Dashboard, 2017-10-05 8:35:28 PM "Baseline"

Fields	Tables	Sheets	Groups	Dimensions	Expressions	Variables	Objects	Actions	Calc
69/69	3/3	9/9	0/0	38/38	370/370	57/57	220/220	48/48	98,468/98,468

- Some columns provide detail on hover

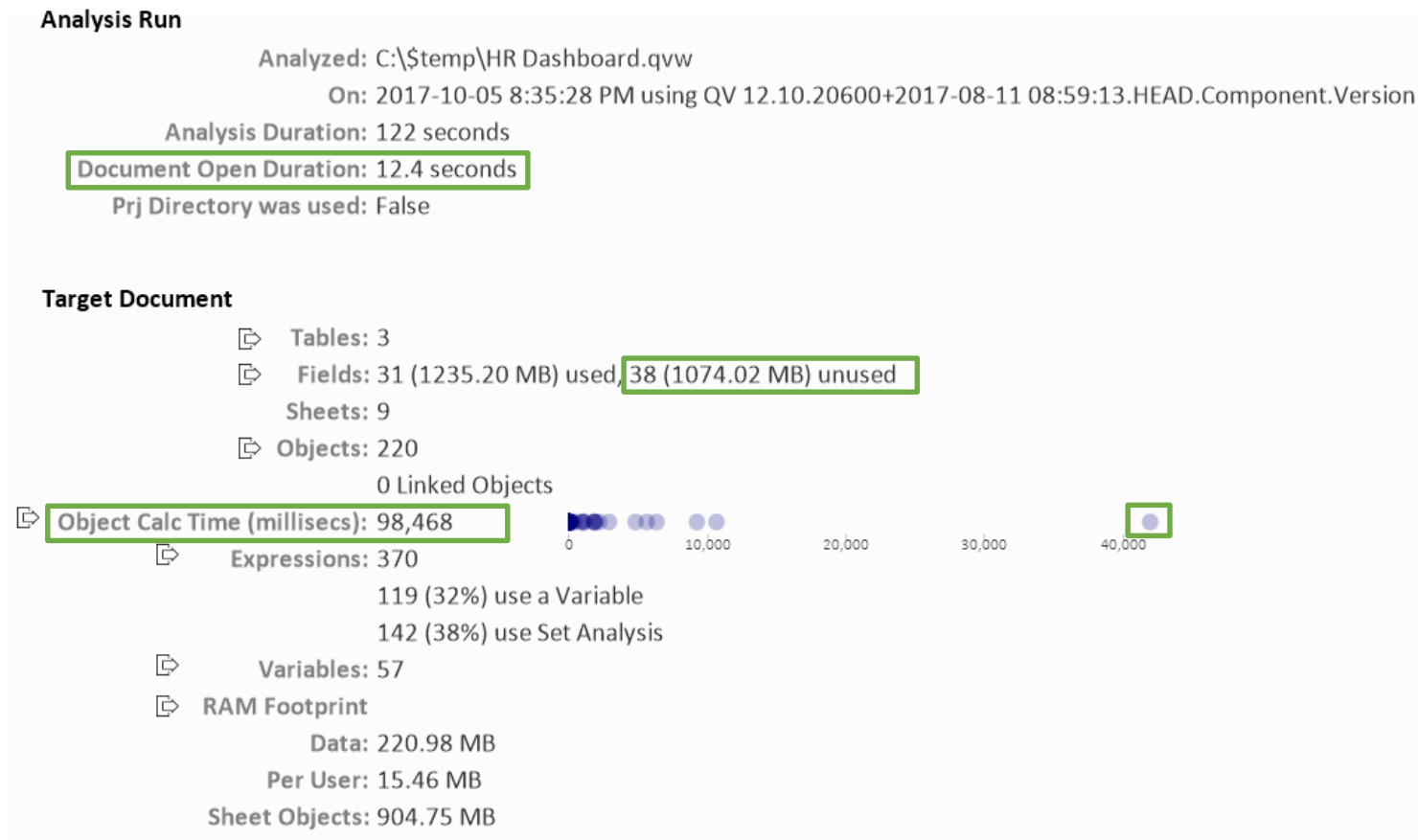
Distinct Values	Bytes /	Symbol Width
10,911,425	206,584,092	8.00
1,930,545	181,708,134	44.00
234,173	118,158,582	
166,209	Symbol space: 36,638,458	
206,358	State space: 234,173	
9,022	18 bit pointer on 36.127M rows: 81,285,951	
5,391	FieldName: UserAgent	
5,043	58,809,768	19.47

QlikView DA: Summary

Our significant metrics are Document Open Duration, Unused data and Object Calc Time.

Other interesting metrics might be Per User RAM, Sheet Object RAM, # of Objects, Use of Variables and Linked Objects.

We can also get a distribution of chart calc times and extremes.



Ensuring Consistent & Complete Results

- Close and reopen all QlikView Desktop instances to clear cache!
- Make sure multiple runs open the document in the same condition:
 - Selections
 - Opening Sheet – should be blank or trivial (more on this later).
- When doing timing tests, it's important to eliminate other CPU uses (other programs) as much as possible. Shut down as many windows as you can.
- It's hard to get 100% reproducibility of Calc Time, but your trends should hold.

QlikView DA: Summary – Ensuring Complete Results

The screenshot shows the 'Summary' tab of the QlikView DA interface. It displays the following information:

- Analysis Run**
 - Analyzed: C:\\$QVTraining\Qon-Performance\DataModel\Performance Sample App.qvw
 - On: 2017-03-07 1:50:03 PM using QV 12.10.20100+2017-02-16 09:28:18.HEAD.Co
 - Analysis Duration: 30 seconds
 - Document Open Duration: 19.2 seconds
 - Prj Directory was used: False
- Target Document**
 - Tables: 14
 - Fields: 40 (254.63 MB) used, 41 (3
 - Sheets: 17
 - Objects: 64
 - 8 Linked Objects
 - Object Calc Time (milliseconds): 4,075
 - Expressions: 48
 - 3 (6%) use a Variable
 - 17 (35%) use Set Analysis
 - Variables: 2
 - RAM Footprint: 1,362.10 MB

Open Duration includes:

- Read from Disk
- Decompressing data
- **Calc of opening sheet**
 - OnOpen ActivateSheet document trigger won't help you here. OnOpen fires after opening sheet is calculated.

Object Calc Time *will not include objects calculated on opening sheet! Those Object timings are lost!*

QlikView DA: Open to an Empty Sheet

Incorrect: opened to an active sheet.

Introduction Main **Summary** Fields Tables

Analyzed: C:\\$QVTraini
On: 2017-03-07 1:5
Analysis Duration: 30 seconds
Document Open Duration: **19.2 seconds**
Prj Directory was used: False

Target Document

- ↳ Tables: 14
- ↳ Fields: 40 (254.63 M
- Sheets: 17
- ↳ Objects: 64
- 8 Linked Objec
- ↳ Object Calc Time (milliseconds) **4,075**
 - ↳ Expressions: 48
 - 3 (6%) use a Va
 - 17 (35%) use
 - ↳ Variables: 2
 - ↳ RAM Footprint: 1,362.10 MB

Save your target document on an empty or trivial sheet.

Correct: opened to a blank sheet.

Introduction Main **Summary** Fields Tables Groups

Analyzed: C:\\$QVTraining\Qon-P
On: 2017-03-07 2:04:08 PM
Analysis Duration: 29 seconds
Document Open Duration: **2.8 seconds**
Prj Directory was used: False

Target Document

- ↳ Tables: 14
- ↳ Fields: 40 (254.63 MB) used, 4
- Sheets: 17
- ↳ Objects: 64
- 8 Linked Objects
- ↳ Object Calc Time (milliseconds) **22,215**
 - ↳ Expressions: 48
 - 3 (6%) use a Variable
 - 17 (35%) use Set Analy
 - ↳ Variables: 2
 - ↳ RAM Footprint: 1,362.10 MB

Measuring Change

You can quantify the effect of a tuning effort – script or expression change – by comparing two DA runs. Options:

- A) Save copies of the Document Analyzer file
- B) Use the DA Compare Tool

The DA Compare Tool

- The Compare Tool is used to report on the differences between Document Analyzer runs.
- Reads the DocumentAnalyzerResults_*.qvd files generated by DA.

Introduction Main Trending Object Compare Script Compare Table Compare Field Compare Server RAM About Change Log

Document Analyzer Compare Tool

Enter Directory to scan for Document Analyzer Result QVDs. Leave blank or "." for current Dir.

Load Result QVDs

3 Analyses loaded

Analysis	Analysis Title	Tables	Fields	Fields Used	Sheets	Objects	Object Calc Time (ms)	Expressions	RAM Footprint
Performance Sample App_20161214_201507 2016-12-14 8:15:07 PM	Baselin	14	81	40 (254.63 MB) used, 41 (31.66 MB) unused	17	64	18,829	48	1,362.10 MB
Performance Sample App_solution_20161211_214043 2016-12-11 9:40:43 PM	Final	13	41	41 (143.98 MB) used, 0 (0.00 MB) unused	16	61	4,157	46	32.54 MB
sampleDoc_20161211_214121 2016-12-11 9:41:21 PM	Baseline	7	20	17 (0.15 MB) used, 3 (0.00 MB) unused	5	54	220	70	0.23 MB

Qvc.LogMessage

00001 2/20/2017 8:45:53 AM; DocumentAnalyzerResults_sampleDoc_20161116_230107.qvd, DaExtractVersion=3.2 not loaded, v3.3 or later required

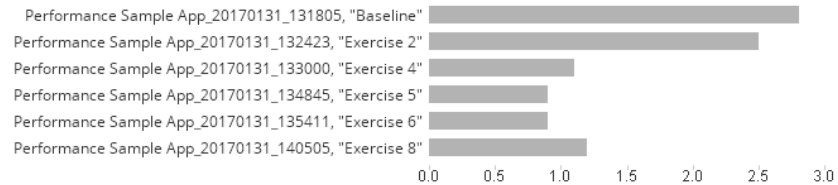


DA Compare Tool Features

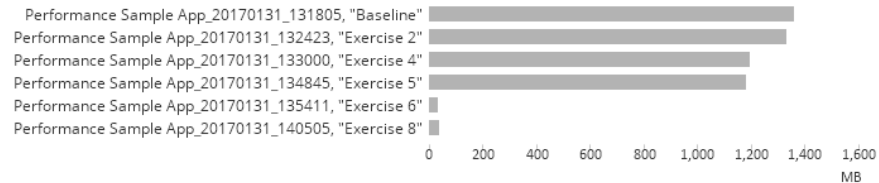
Comparison of Performance Metrics over all results QVDs.

Performance Metrics

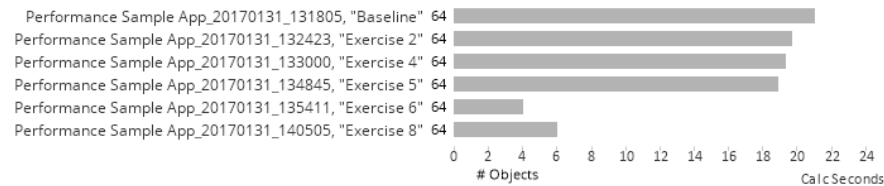
Document Open Seconds



RAM Footprint (MB)



Object Calc Time (milliseconds)



DA Compare Tool Features

- Comparison between two selected results.
 - Tables, Fields
 - Object performance
 - Script
- Uses “Left/Right” nomenclature like a diff program.

Object Calc Time			Expression Detail					
Object Calc Time. Hide Caption								
Objects running faster: 14			Objects running slower: 13					
ObjectID	Object Type	Caption	Left Calc	Right Calc	Calc Diff	Left Mem	Right Mem	Mem Diff
BU01_784174577	Button		0	0	0	512	512	0
CH01	Straight Table	Sales by Customer - Multi Table	297	156	-141	31K	30K	-64
CH02	Straight Table	Sales By Customer	172	109	-63	30K	30K	0
CH06	Straight Table	Sales By Product	125	110	-15	57K	26K	-31K
CH09	Straight Table	Sales By Month	187	329	142	5K	5K	0
CH11	Straight Table	Link Table Size	0	0	0	7K	7K	0
CH12	Straight Table	Sales By Region	172	110	-62	5K	5K	0
CH13	Straight Table	Order Detail		0	0		512	512
CH13	Pivot Table	Order Detail	16,734		-16,734	1,203M		-1,203M
CH14	Straight Table	ExpressShip Sales - Flag Set Analysis	93	63	-30	30K	30K	0
CH14_CustYear1	Straight Table	Sales By Customer and Year 1	235	391	156	70K	70K	0
CH15	Straight Table	Sales - Set Analysis Field Operation	47	32	-15	30K	30K	0
CH15_CustYear2	Straight Table	Sales By Customer and Year 2	234	0	-234	70K	70K	0
CH16_865434853	Straight Table	Channel Sales - Dynamic	312	390	78	5K	5K	64
CH18	Straight Table	Sales - Set Analysis Record Operation	47	0	-47	30K	30K	0
CH19_050262043	Straight Table	Channel Sales - USD, no Tax	125	94	-31	5K	5K	0
CH20_015427524	Scatter Chart	Customer Order Profile	0	16	16	512	512	0
CH21_148747363	Straight Table	ExpressShip Sales - Dual Numeric Comparison	187	250	63	30K	30K	0

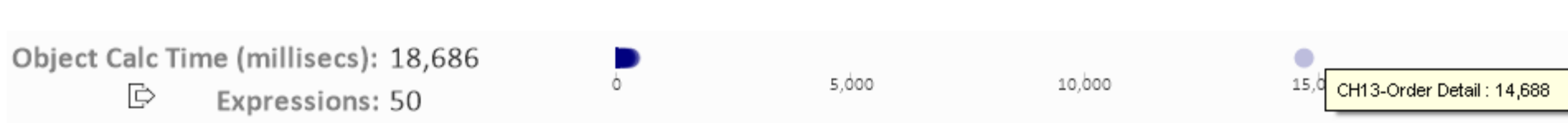


My Typical Tuning Approach

1. Fix the easy outliers
2. Focus on Memory
3. Focus on Calculation Time
4. Look for known “gotchas”

An Outlier

The Summary sheet shows an outlier in Object Calc Time. A hover reveals the object identity.



Objects Sheet

On the Objects sheet, sorting by Calc Time will bring our outlier to the top.

Selecting a single object will light a “Goto Object” button that will take us directly to the object in the target QVW

This is a large Pivot table. We can use a Calculation Condition to limit the amount of data processed.

The screenshot shows the Qlik Objects sheet interface. At the top, there are tabs for various object types: Fields, Tables, Groups, Dimensions, Expressions (selected), Variables, Objects, Actions, Memory, Fonts, Recommendations, and Extra. Below the tabs, the title reads "Analyzing: Performance Sample App, 2017-10-06 11:26:34 AM 'Baseline'".

A summary table is displayed with the following data:

Fields	Tables	Sheets	Groups	Dimensions	Expressions	Variables	Objects	Actions	Calc
9/81	5/14	1/17	0/0	7/27	2/50	0/2	1/65	0/2	14,688/18,686

Below the summary table, there is a "SheetIdName" section with a scrollable list of sheet names: SH07-Order Detail, SH_Introduction-Introduction, and SH01-Template. A "Goto Object" button is visible below the scroll bar.

The "Object Detail" section contains a table with the following data:

ObjectId	ObjectType	Caption	ObjectSize	Calc Time /	Dimensions	Expressions	Distinct Expressions	Actions
CH13	Pivot Table	Order Detail	1,203,366,080	14,688	7	2	2	0



Fields Sheet - DROP Unused Fields

- DA provides a list of Fields that *apparently* are not referenced in the UI.
- Watch out for fields that may be used in Server Objects.
- A suggested DROP statement is provided.
- Focus on the larger fields.
- Copy and Paste DROP statement from DA to target script.

Do not use this DROP Field list without reviewing the contents!
There are some cases where fields actually in use may appear on the list!

DROP FIELD Statements (41/41)

```

DROP FIELD
[AccountNumber],
[AddressLine1],
[AddressLine2],
[AddressType],
[BillToAddressID],
[City],
[Color],
[Comment],
[CreditCardApprovalCode],
[Day],
[DiscontinuedDate],
[EmailAddress],
[FirstName],
[Freight],
[LastName],
[MiddleName],
[NameStyle],
[OnlineOrder],
[PasswordHash],
[PasswordSalt].
    
```

Field References

FieldName	Field Is...	Bytes /	Symbol Width
Comment	N	30,827,882	67.01
AccountNumber	N	288,121	20.00
PurchaseOrderNumber	N	288,068	18.34
ShipToAddressID	N	287,737	8.00
BillToAddressID	N	287,737	8.00
Freight	N	287,737	8.00
TotalDue	N	287,737	8.00
SubTotal	N	287,737	8.00
ThumbnailPhoto	N	253,307	6003.76
Status	N	57,491	0
RevisionNumber	N	57,491	0
PasswordHash	N	23,393	50.00
EmailAddress	N	15,745	32.62
AddressLine1	N	12,222	25.52



Let's Fix the Outlier and DROP FIELDS

QV: Chart properties General

Detached

Read Only

Calculation Condition

```
//count(DISTINCT Customer)=1
```

Chart Type

- Apply these changes to the target document and re-analyze.


Do not use this DROP Field list without reviewing the contents!
There are some cases where fields actually in use may appear on the list!

DROP FIELD Statements (41/41)

```
DROP FIELD  
[AccountNumber],  
[AddressLine1],  
[AddressLine2],  
[AddressType],  
[BillToAddressID],  
[City],  
[Color],  
[Comment],  
[CreditCardApprovalCode],  
[Day],  
[DiscontinuedDate],  
[EmailAddress],  
[FirstName],  
[Freight],  
[LastName],  
[MiddleName],  
[NameStyle],  
[OnlineOrder],  
[PasswordHash],  
[PasswordSalt].
```



Evaluating Results using QlikView DA Compare

- Press the  button on the Main sheet to open DaCompareTool.qvw.
 - *Note: The CT button lights when it finds the file specified in vDaCompareToolName. You can also open any DaCompareTool.qvw file directly.*
- On the Main sheet, confirm the QVD results directory and press the “Load Results QVDs” button.
- We expect to see some reductions in Open Time, Memory and Calc Time



Focusing on Memory

- Drop or don't load unused Fields
- Don't load unneeded rows
- Reduce the number of unique values – Cardinality
- AutoNumber large Keys

Reducing Cardinality

- Field ShipTime contains not just Time, but Date + Time. This results in many (460K) unique values across our 14 months of Orders.

Field References

FieldName	Distinct Values	Bytes /	Symbol Width
ShipTime	459,918	5,231,568	8.00

- If we were to store only the Time portion, the maximum unique values would be 86,440 (number of seconds in a day).

```
Time (Frac (ShipTime)) as ShipTime,  
Date (Floor (ShipTime)) as ShipDate,
```

Field References

FieldName	Distinct Values	Bytes /	Symbol Width
ShipDate	451	517,859	0
ShipTime	46	345,353	8



Autonumbering Keys

- Field [SalesOrderDetailID] is a key field. Do we ever display this key value?
- A properly AutoNumber-ed field will eliminate the symbol storage, but will not change pointer size.
- What will be the RAM reduction if we AutoNumber() this field?

Field References			
FieldName	Field Is Used	Key Field	Cal Dim
SalesOrderDetailID	Y	Y	

Bytes /	
Count	Distinct Values
173,821,832	7,758

Symbol space: 143,756,871
State space: 7,758,477
23 bit pointer on 7.759M rows: 22,306,484
FieldName: SalesOrderDetailID



Focusing on Calc Time

- Calculated Dimensions
- Multi-Table Expressions
- Inefficient Expressions
- Heavy Functions
- Expression Abuse

Performance is Linear

- Double the data, double the calculation time.
- Twice the Hardware CPU speed, half the calculation time.

Which means...

- You can tune using half the data.
- You can predict the effect of hardware on performance.

A Note on Calc Time Values

QlikView DA gets Object Calc Times from the .mem file. These are the same numbers you see on the Sheet Properties, Objects tab. All visible objects on a sheet are calculated in parallel. Calc numbers are impacted by number of objects, number of processors and the order of calculation.

The way to get true “single object” timing in QlikView is to place the object on a sheet by itself. Or minimize all objects and restore them one at a time.

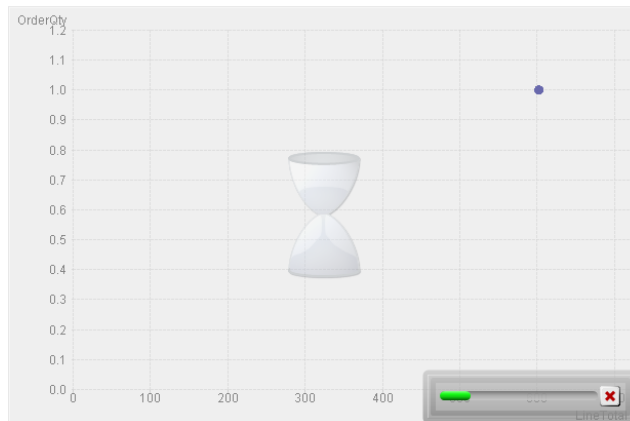
Un-Accounted Calc Time

- The calc time for chart level visual expressions – Axis Max, Visual Cues, Conditional Show, Reference Lines, Text in Chart – are not recorded in calc time.

Sheet Properties [Computation of Visual Attributes]

ObjectID	Type	Caption	ShowMode	State	CalcTime	Layer
CH20_015	Scatter Chart	Customer Order Profile	Normal	<inherited>	16	
CS01	Current Selecti	Current Selections	Normal	<inherited>	0	
LA01	Line/Arrow		Normal	<inherited>	0	

- But they are definitely felt!



- DA gives us a single view of all expressions in the object and their locations.

Expression to FieldName	Expression Usage Count			
	Expression	Usage Count	Object Count	Table Count
		6	1	
avg({<Customer=>}aggr(sum({<Customer=>}LineTotal),SalesOrderNumber))		1	1	2
avg({<Customer=>}aggr(sum({<Customer=>}OrderQty),SalesOrderNumber))		1	1	2
Sum ([LineTotal])		1	1	1
Sum ([OrderQty])		1	1	1
SalesOrderNumber		0	1 -	
-		0	1 -	
=		1	1 -	
=blue()		1	1 -	

Expression Location	
BkgColorExp.Definition	2 2
ButtonProperties.Parameters_OB...	
ExpressionData.Definition	2 2
Frame.Name	
Frame.Show	
Layout.Text	
Listbox.Properties.Title	
Parameters.StringExpr	
ReferenceLineDef.Definition	2 6
Show.Expression	
Variable.Definition	

Function	
aggr	2
avg	2
blue	1



Inefficient Expressions

- A lot of **If()** in that expression.
- No “short circuit” so all options are evaluated every time.
- Could be replaced by a more efficient variable that returns the expression string to be evaluated.

Expression to FieldName

Expression Label	Ena	Expression
Sales	Y	<pre> if(UI_Currency='USD' AND UI_IncludeTax='No' ,Sum(LineTotal) ,if(UI_Currency='USD' AND UI_IncludeTax='Yes' ,Sum(LineTotal + if(TaxAmt>2000, TaxAmt*.8, TaxAmt*.9)) ,if(UI_Currency='EUR' AND UI_IncludeTax='No' ,Sum(LineTotal) * 1.15 ,if(UI_Currency='EUR' AND UI_IncludeTax='Yes' ,Sum(LineTotal) + sum(if(TaxAmt>median(TOTAL TaxAmt), TaxAmt*.8, TaxAmt*.9)) * 1.15)))) </pre>

ObjectType	Caption	ObjectSize	Calc Time /
Straight Table	Channel Sales - Dynamic	4,672	313

<http://qlikviewcookbook.com/2014/12/how-not-to-choose-an-expression/>
<http://qlikviewcookbook.com/2014/12/how-to-choose-an-expression/>



Calculated Dimensions

- Filter
DimensionType=Calculated
on the **Dimensions** sheet.

- Can they be replaced with
script fields?

- Are they associated with
objects with high Calc
times?

The screenshot shows the Qlik Enterprise Desktop interface with the 'Dimensions' sheet selected. A search filter is applied to 'DimensionType=Calculated'. A table titled 'Dimension Has Label' is visible, showing the following data:

DimensionType	Count
Calculated	5
CyclicGroup	2
DrillGroup	1
Missing Field	3
Named	52

The main 'Dimensions' table shows a list of dimension objects with columns for DimensionType, DimensionName, DimensionLabel, and # Objects. The following table represents the data from this table:

DimensionType	DimensionName	DimensionLabel	# Objects
Named	\$Table		1
Named	%Language		1
Calculated	=%Language	Listbox using Expres...	1
Calculated	=aggr(only(<Region=30>)(Customer Name))[...]	Customer	1
Calculated	=if(Region = 'U', 'Customer Name')	Expression Listbox	1
Calculated	=if(Region = 30, 'Customer Name')	Region 30 Cust	1
Calculated	=if(Region = 30,	Customer Name	1
Named	Customer City		5
Named	Customer Name		12
Named	Customer Name	Customer	1
Named	Customer Name	Customer MB	1
Named	Customer*		1
CyclicGroup	CustomerCycleGroup		2
DrillGroup	CustomerDrillGroup		1
Named	Description		2
Named	Description	Product Description	1
Named	Invoice Amount (without tax)		1
Named	MyMBField		1
Named	MyMBField2		1
Named	Order Date		2
Named	OrderId		3
Named	Price		1
Named	Price	Price Statistics	1
Missing Field	ProductName		2
Named	Quantity		1
Missing Field	ReclId		1
Named	Region		12
Named	Region	Sales Region	1
Named	Size		2
Named	XYZ		1

Multi-Table Expressions

- Expression “Table Count” attempts to identify how many tables are involved in the non-set part of an expression.

- Expressions requiring data from more than one table may be a performance challenge.

Expression to FieldName	Expression Usage Count			
	Expression	Usage Count	Object Count	Table Count /
		51	32	
count({1}DISTINCT SalesOrderID)		1	1	3
if(UI_Currency='USD' AND UI_IncludeTax='No' ,Sum(LineTotal) ,if(UI_Currency='USD' AND UI_IncludeTax='Yes'...		1	1	3
sum(OrderQty * ListPrice) - sum(LineTotal)		1	1	2
sum(OrderQty * SalesListPrice) - sum(LineTotal)		1	1	2
sum(if(ExpressShip=1 , LineTotal))		1	1	2

Functions Review

Analysing: Performance Sample App, 2018-03-02 10:59:09 AM "10 No Short Circuit"

Fields	Tables	Sheets	Groups	Dimensions	Expressions	Variables	Objects
41/41	13/13	17/17	1/1	28/28	51/51	2/2	66/66

Expression to FieldName	Expression Usage Count		
	Expression	Usage Count	Object Count
		51	32
count({1}DISTINCT SalesOrderID)		1	1
if(UI_Currency='USD' AND UI_IncludeTax='No' Sum(LineTotal) ,if(UI_Currency='USD' AND UI_IncludeTax='Yes'...		1	1
sum(OrderQty * ListPrice) - sum(LineTotal)		1	1
sum(OrderQty * SalesListPrice) - sum(LineTotal)		1	1
sum(if(ExpressShip=1, LineTotal))		1	1
sum(if(ExpressShipText='Yes', LineTotal))		1	1
sum(if(ExpressShipNum=1, LineTotal))		1	1
sum(if(ExpressShip='Yes', LineTotal))		1	1
sum(LineTotal * ExpressShip)		1	1
sum(LineTotal * ExpressShipNum) // Right!		1	1
sum(if(ExpressShipNum=1, LineTotal)) //Wrong!		1	1
Sum(LineTotal * \$(=minstring(UI_CurrencyRate)))		1	1
Sum(LineTotal * \$(=minstring(UI_CurrencyRate)))		1	1

Expression Location	Count
BkgColorExp.Definition	2
ButtonProperties.Parameters_OBSOLETE	1
ExpressionData.Definition	36
Frame.Name	2
Frame.Show	1
GraphProperties.EvaluationCondition	2
Layout.Text	4
ListBoxProperties.Title	2
Parameters.StringExpr	1
ReferenceLineDef.Definition	2
Show.Expression	1
Variable.Definition	1

Function	Count
aggr	2
avg	2
blue	1
count	12
documentpath	4
if	11
index	2
interval	1
minstring	2
num	8
only	1
reloadtime	1

- Check out the visual expressions (not ExpressionData.Definition). Their calc time will not be recorded.

- Examine how the “heavy” functions – if(), aggr() – are used.

Looking for known “gotchas”

- Actions
- Like Objects
- Conditional Dimension/Expression abuse

Review the Action Sheet

- Review the Actions sheet and get a general understanding of what they are used for.
- Pay particular attention to the “Document OnAnySelect” trigger.

Introduction Main Summary Fields Tables Groups Dimensions Expressions Variables Objects **Actions** Memor

Search Analyzing: sampleDoc, 2017-03-08 3:10:41 PM "Baseline"

Fields	Tables	Sheets	Groups	Dimensions	Expressions	Variables	Obj
20/20	7/7	6/6	5/5	25/25	67/67	5/5	54

SheetName

Main	Opening Sheet	Sheet1	Sheet2	Sheet3
------	---------------	--------	--------	--------

Actions

Associated Id	Action Location	Sequence	ActionType	Parameter 1	Parameter 2
	Document OnOpen	1	CLEAR_ALL		
	Document OnOpen	2	ACTIVATE_SHEET	SH01	
	Document OnAnySelect	1	MACRO	aSub	
BU01	Object	1	PREV_TAB		
BU02	Object	1	FIELD_SELECT	[Customer City]	='ABC'
BU03	Object	1	PREV_TAB		
Customer Name	Field OnChange	1	CLEAR_FIELD	Description	
Customer Name	Field OnSelect	1	CLEAR_FIELD	Region	
SH01	Sheet OnActivate	1	CLEAR_ALL		
SH01	Sheet OnLeave	1	CLEAR_FIELD	Customer	
SH04	Sheet OnActivate	1	CLEAR_ALL		
SH04	Sheet OnActivate	2	FIELD_SELECT	Customer	zzz
SH04	Sheet OnLeave	1	UNLOCK_ALL		
TX09_Action	Object	1	CLEAR_ALL		
TX09_Action	Object	2	FIELD_SELECT	Customer Name	ABC Corp
TX09_Action	Object	3	CLEAR_FIELD	Region	
vMyVar	Variable OnInput	1	CLEAR_FIELD	Size	

Current Selections

ActionLocation

- Document OnOpen 2
- Document OnAnySelect 1
- Variable OnInput 1
- Field OnChange 1
- Field OnSelect 1
- Sheet OnActivate 3
- Sheet OnLeave 2
- Object 6

ActionType

- ACTIVATE_SHEET 1
- CLEAR_ALL 4
- CLEAR_FIELD 5
- FIELD_SELECT 3
- MACRO 1
- PREV_TAB 2
- UNLOCK_ALL 1

QlikView Like Objects

Different Objects with same Object Type, Dimensions and Expressions. Candidates for the more efficient linked objects.

Has Set Analysis

N	21	Y	12
---	----	---	----

Linked Object

N	57	Y	8
---	----	---	---

Like Object Count

?

2	6
3	3

ObjectType

Button	1
Current Selections	3
Line/Arrow Object	1
List Box	21
...	...

Expression Exhaustion

Review the Expression Location counts. Are they reasonable, are they explainable?

Expression Location

BkgColorExp.Definition	5
ChartDimensionDataDef.SortCriteria	7
Data.EnableCondition	91
Dimension	27
ExpressionData.Definition	391
Frame.Show	7
GraphProperties.EvaluationCondition	8
Layout.Max	4
Layout.Min	4
Layout.Text	40
Parameters.StringExpr	5
Show.Expression	7
SortCriteria.Expression	7
TextColorExp.Definition	2
Title.Title	20
Variable.Definition	132

- They may lead to you to something interesting...

QlikView Recommendations Sheet

List of recommendations and quantification of potential benefit.

Introduction Main Summary Fields Tables Groups Dimensions Expressions Variables Objects Actions Memory Fonts **Recommendations**

Search Analyzing: Performance Sample App, 2017-03-07 2:04:08 PM "Baseline"

Fields	Tables	Sheets	Groups	Dimensions	Expressions	Variables	Objects	Actions	
81/81	14/14	17/17	0/0	28/28	48/48	2/2	64/64	2/2	22,2

Document Recommendations
None

Field Recommendations

FieldName	Potential Savings	Recommendation
	98,145,481	
SalesOrderDetailID	81,689,055	This Key Field may be using more memory than necessary. If the value is not displayed in the UI, it can be converted to a more efficient integer value in the script using the AutoNumber() function. <ul style="list-style-type: none"> In the script, "AutoNumber(Fieldname, 'FieldName') as FieldName"
ShipTime	12,051,919	This numeric field is occupying more than the optimal 8 bytes. Correct this problem by explicitly setting to a numeric format either by: <ul style="list-style-type: none"> Document Properties -> Settings, Number pane. Change from "Mixed" to an appropriate numeric format. Format the field using Num() in the script.
SalesOrderID	4,383,132	This Key Field may be using more memory than necessary. If the value is not displayed in the UI, it can be converted to a more efficient integer value in the script using the AutoNumber() function. <ul style="list-style-type: none"> In the script, "AutoNumber(Fieldname, 'FieldName') as FieldName"
Date	4,994	This numeric field is occupying more than the optimal 8 bytes. Correct this problem by explicitly setting to a numeric format either by: <ul style="list-style-type: none"> Document Properties -> Settings, Number pane. Change from "Mixed" to an appropriate numeric format. Format the field using Num() in the script.
Date	4,994	This Key Field may be using more memory than necessary. If the value is not displayed in the UI, it can be converted to a more efficient integer value in the script using the AutoNumber() function. <ul style="list-style-type: none"> In the script, "AutoNumber(Fieldname, 'FieldName') as FieldName"
ShipDate	4,924	This numeric field is occupying more than the optimal 8 bytes. Correct this problem by explicitly setting to a numeric format either by: <ul style="list-style-type: none"> Document Properties -> Settings, Number pane. Change from "Mixed" to an appropriate numeric format. Format the field using Num() in the script.
		This numeric field is occupying more than the optimal 8 bytes. Correct this problem by explicitly setting to a numeric format either by:

Field Is Used N Y **Keyfield** Y N

Document Recommendation

Field Recommendation
 Autonumber Key 3
 Numeric Size 11

QlikView Available Recommendations

■ Numeric Size

- This numeric field is occupying more than the optimal 8 bytes. Correct this problem by explicitly setting to a numeric format either by: • Document Properties -> Settings, Number pane. Change from "Mixed" to an appropriate numeric format. • Format the field using Num() in the script.

■ Autonumber Key

- This Key Field may be using more memory than necessary. If the value is not displayed in the UI, it can be converted to a more efficient integer value in the script using the AutoNumber() function. • In the script, "AutoNumber(Fieldname, 'Fieldname') as FieldName"

■ Missing Field

- A missing field is used as Dimension name. On the "Dimensions" sheet, select DimensionType='Missing Field' to identify the affected object. Either change the Dimension name in the object or create the field in the load script.

■ GenerateLogfile

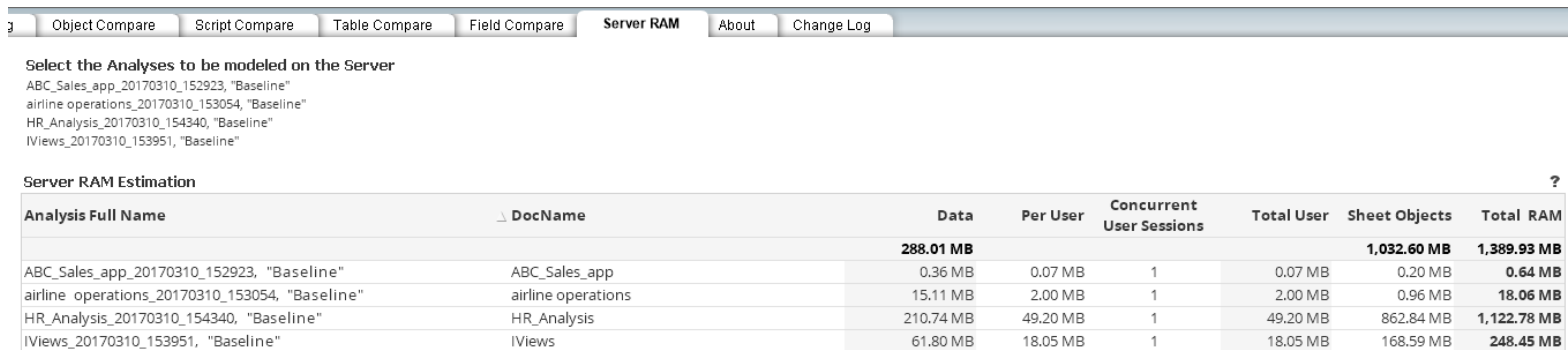
- This document does not have a Generate Logfile enabled. Almost all Documents should enable Script Log File to provide for error and performance analysis of the script execution. GenerateLogfile, • Document Properties -> Settings General pane. Check on "Generate Logfile".

Other DA Uses – Development Standards

- Naming standards – Fields, Variables, Dimension & Expression Labels, Comments
- Coding Standards
 - Use of Variables for Expressions
 - Use of Set Analysis
 - Specific standards – if() vs. Set Analysis
 - Duplicate labels
 - Build your own analysis or focus
 - How many characters in each expression?
 - How many Dimensions are re-labeled? Are they labeled consistently?

QlikView Server RAM Sizing using DA Compare

- Can model multiple users
- Still need to manually estimate cache requirement
- Sheet objects is perhaps overestimated as it's unlikely all objects would be calculated at the same instant.



Select the Analyses to be modeled on the Server

ABC_Sales_app_20170310_152923, "Baseline"
airline operations_20170310_153054, "Baseline"
HR_Analysis_20170310_154340, "Baseline"
IViews_20170310_153951, "Baseline"

Server RAM Estimation

Analysis Full Name	DocName	Data	Per User	Concurrent User Sessions	Total User	Sheet Objects	Total RAM
		288.01 MB				1,032.60 MB	1,389.93 MB
ABC_Sales_app_20170310_152923, "Baseline"	ABC_Sales_app	0.36 MB	0.07 MB	1	0.07 MB	0.20 MB	0.64 MB
airline operations_20170310_153054, "Baseline"	airline operations	15.11 MB	2.00 MB	1	2.00 MB	0.96 MB	18.06 MB
HR_Analysis_20170310_154340, "Baseline"	HR_Analysis	210.74 MB	49.20 MB	1	49.20 MB	862.84 MB	1,122.78 MB
IViews_20170310_153951, "Baseline"	IViews	61.80 MB	18.05 MB	1	18.05 MB	168.59 MB	248.45 MB

- May want to run DaBatch.cmd to generate result QVDs.

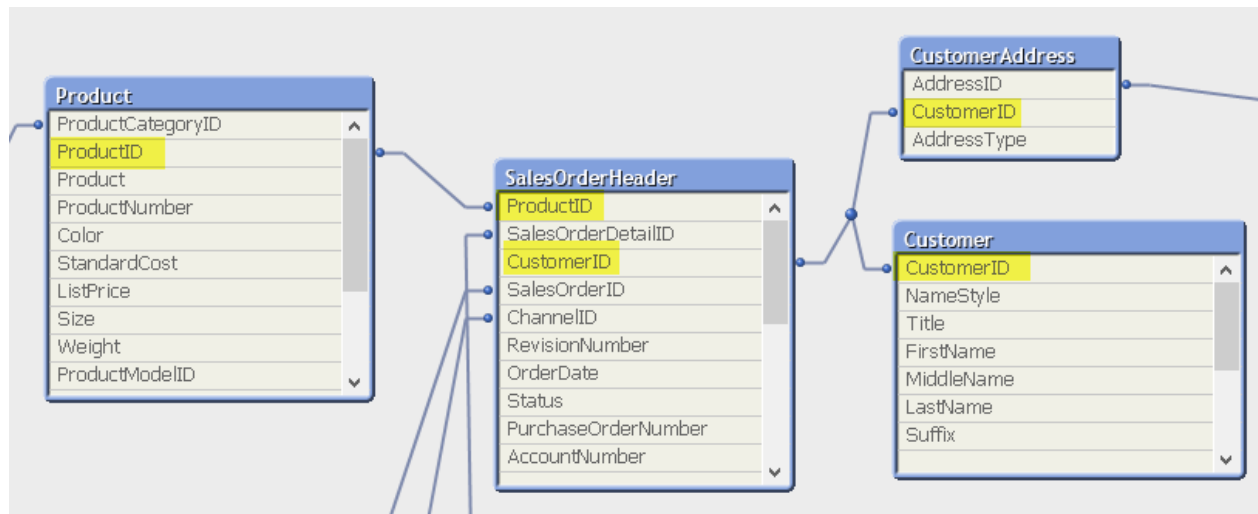


So Which is Faster?

Count the number of Customers who have purchased more than one Product:

1) `Count (Distinct {<CustomerID={ "=Count (Distinct ProductID) >1" } >} CustomerID)`

2) `Sum (aggr (Count (Distinct ProductID) , CustomerID) >1)`



Questions



Thank You

Want to learn more? Check out these resources:



Stay in the know on Qlik product innovations. Register for our quarterly webinar series.

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Connect with Qlik enthusiasts around the world. Learn, share and explore. Register today.

community.qlik.com

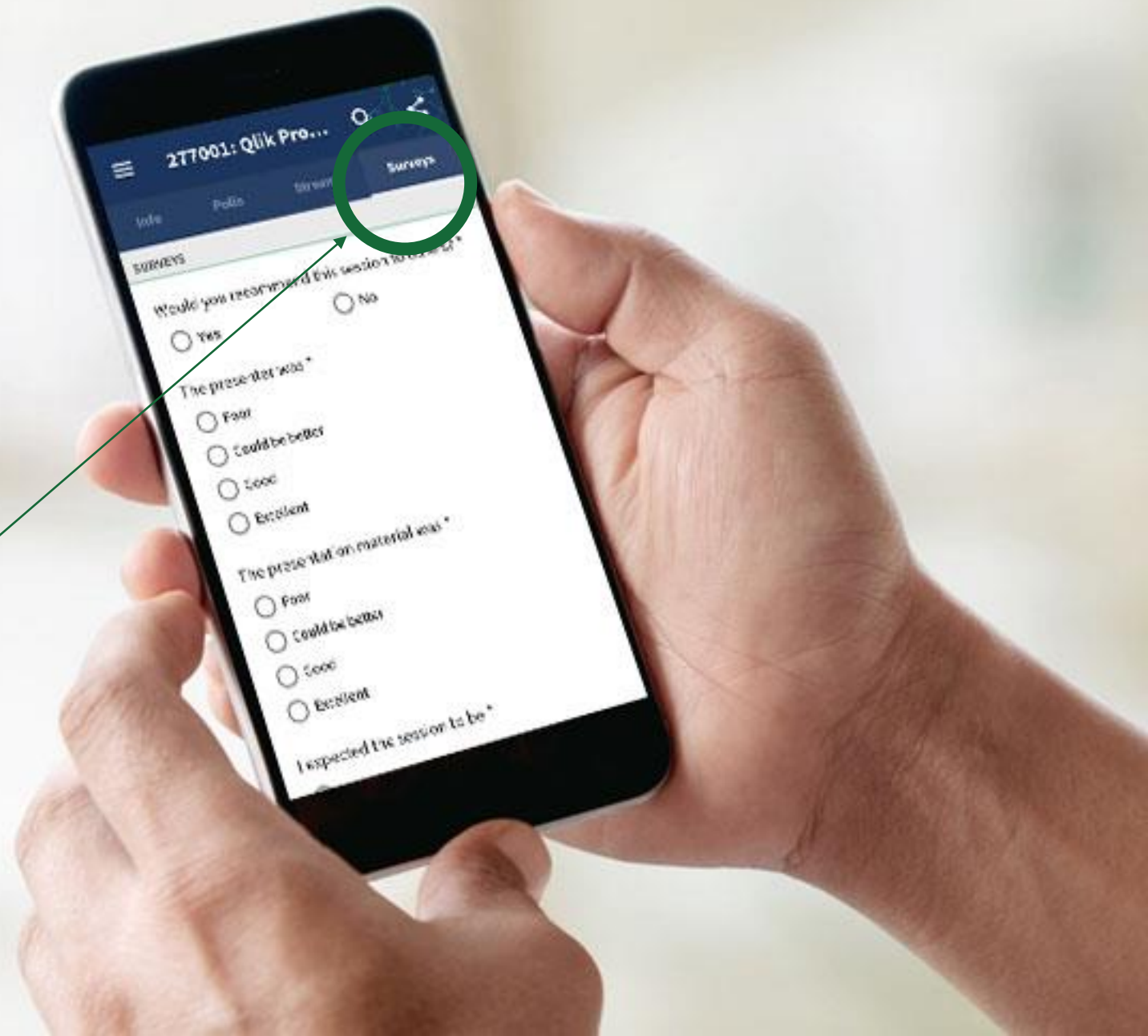
Breakout Session Survey

We strive to improve the event each year and are interested in hearing your feedback on this session.

To access the session survey please log into the mobile app and click this session on your personal agenda.

Click the Survey button in the top menu to complete the survey.

We thank you in advance!



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Thank You

