

SQL SATURDAY - SALT LAKE CITY - 2020

SQL LOGIN DATA WAREHOUSE

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[HTTPS://GITHUB.COM/GWALKEY](https://github.com/gwalkey)

ANSWER MY LOGIN QUESTION:



Who



How Often



Server



Database



Client/Host



Application



When



PIECES OF THE SOLUTION

- Extended Event Sessions
- Powershell XE Importer
- OLTP Relational Database
- OLAP Star Schema Database
- SSAS Tabular Database
- SQL Agent Jobs – Data Collectors/Aggregators
- Excel Pivot Table as Front-End

EXTENDED EVENT SESSION

- Collects only the XE Login Event to file
- Collects only successful logins
- XE is very lightweight
- Even with fast-polling apps (50 logins/sec)
- XE Sessions automatically start when SQL Starts
- Logging 9M+ Events a day for one server
- The XEL trace files are copied up to a Central Server for ETL and reporting

POWERSHELL EXTENDED EVENTS IMPORTER

- MS Recommends
 - <https://docs.microsoft.com/en-us/sql/relational-databases/system-functions/sys-fn-xe-file-target-read-file-transact-sql?view=sql-server-2017>
 - 11 Hours on 9M+ Trace file
- Dan Guzman – SQL MVP – (**QueryableXEventData**)
 - <https://dba.stackexchange.com/questions/206863/what-is-the-right-tool-to-process-big-xel-files-sql-server-extended-events-log>
 - **11 Minutes on 9M+ Trace file**
- Load 2 Standard SQL Server Assemblies
 - C:\Program Files\Microsoft SQL Server\150\Shared\Microsoft.SqlServer.XEvent.Linq.dll
 - C:\Program Files\Microsoft SQL Server\150\Shared\Microsoft.SqlServer.XE.Core.dll

OLTP RELATIONAL DATABASE

- Used to Bulk-Load the XE session files from all Servers into SQL
 - Aggregate these Metrics:
 - Server
 - Database
 - Host
 - Application String
 - User/Login
 - Hour of Day
 - **Connection Count per Hour**
 - ETL Errors go to Errors Table for inspection during QA Pass

OLAP STAR SCHEMA DATABASE

- Typical Star-Schema Database
 - Used to feed the SSAS Tabular Model
 - Date Dimension
 - Server Dimension
 - Database Dimension
 - Host Dimension
 - Application Dimension
 - Login/User Dimension
 - Single Fact Table Measure: Logins per Hour

ORIGINAL WAS SSAS MD CUBE

- Why Multidimensional?
 - Project Started in 2014
 - My First Data Warehouse
 - Tabular still 1.0-ish in 2014
 - Didn't have enough \$\$\$ Memory on Server for Tabular
 - Didn't have Enterprise Edition
 - Learned Data Warehousing using MD and MDX
- Not showing you how to build the Cube today
 - Takes too Long
 - Download the ABF and Restore it from my Github repo
 - MOLAP Cube (ROLAP/Clustered ColumnStore an Option)

SQL AGENT JOBS

- Jobs on each Monitored Server
 - Manage the XE Session
 - XE Session Target Filename changes at Midnight
 - XE Session Target Filename matches Day of Week
- Jobs on Central Server
 - Copy XE Session files from Monitored servers
 - Import and Clean all XE Session Files
 - ETL loads OLTP and OLAP Databases
 - Process Tabular Model

EXCEL FRONT-END

- Why Excel and Not Power BI?
 - Pivot Tables fit better
 - Easier Drill-Down
 - Easier Filtering

EXCEL SAMPLE

Total Connections	Column Labels						2020 Total	Grand Total
	2019	2020	2020 - Q1 2020 - Q2 2020 - Q3			2020 - Q3 Total		
Row Labels			July	August				
AdventureWorks2017	71	1087	5	3	11	14	1106	1177
AdventureWorksDW2014	30	572		1	9	10	582	612
AdventureWorksDW2017	20	411		1	10	11	422	442
BuoyData	1096	66348	664	204	122	326	67338	68434
ContosoRetailDW	21	365		1	9	10	375	396
DBA	42	292	7	5	14	19	318	360
inbound	1727	1078	731	264	205	469	2278	4005
master	196438	136510	1678	812	2181	2993	141181	337619
model	16	48			8	8	56	72
msdb	1045686	257281	95773	4820	3044	7864	360918	1406604
OSMetrics	218243	91507	41049	1	15	16	132572	350815
ReportServer	3862686	1154698	53955	57601	11	57612	1266265	5128951
ReportServer2019		317					317	317
ReportServer2019TempDB		187					187	187
ReportServerTempDB	24	234		1	11	12	246	270
ServerTrace_DW	7587	4260	3776	1371	977	2348	10384	17971
SQLAlerts	703	360	173	1	9	10	543	1246
SSISDB	18	112		1	9	10	122	140
StackOverflow2013		12	1	1	9	10	23	23
VotingBooth	26	218		1	12	13	231	257
WideWorldImporters	34	226		1	12	13	239	273
WideWorldImportersDW	29	223		1	12	13	236	265
Grand Total	5334497	1716346	197812	65091	6690	71781	1985939	7320436

OPERATIONAL STATISTICS

- Running since 2015
 - 21 Servers
 - 347 Databases
 - 8599 Hosts
 - 1040 Application Strings
 - 9500 User/Logins
 - Fact Table 35M+ Rows
 - 25 Billion Logins
- SQL DW is 7GB, MD Cube is 300MB, Tabular is 520MB
- Entire Daily Import Process takes 12 Minutes

The background is a deep blue to purple gradient. It features several abstract elements: a large circular scale on the left with markings from 140 to 260; several concentric circles and arcs in white and light blue; and a dense field of out-of-focus circular bokeh in shades of blue and purple.

DEMO

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EXTENDED SETUP NOTES

- Posh, SQL and Agent Job Script Customizations
 - Posh – remote and local XEL file copy locations
 - SQL – Cleaning Steps
 - Jobs – Edit XE Job on remote servers for XEL folder
 - Jobs – Edit Step 3 Job on Central Server to match above folders
- Tabular Model
 - Default Datasource connects to SSAS Instance on localhost
 - Assumes your SQL engine and SSAS instance are on same box
 - Publish included VS Solution or restore sample ABF file
 - Edit the Tabular solution Datasource connection and republish to put each on different boxes



THANK YOU!

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