SQL SATURDAY - SALT LAKE CITY - 2020

SQL LOGIN DATA WAREHOUSE

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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							
	2019	2020					2020 Total	Grand Total
		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

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 Tabular instance on same box
  - Publish included VS Solution or restore sample ABF file
  - Edit the Tabular solution Datasource connection and republish to put on another box

THANK YOU!

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