

A black and white photograph of a coyote standing and looking directly at the camera. The coyote has a greyish-brown coat and pointed ears. The text "What is causing my database to grow?" is overlaid on the image in a large, bold, black font.

**What is causing my
database to grow?**

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Has this ever happened to you?

- **4am call on Sunday morning from IT Operations about low disk space on a database server?**
- **Errors messages:** “Could not allocate a new page for database 'database' because of insufficient disk space in filegroup 'PRIMARY'.”
- **High wait time for PREEMPTIVE_OS_WRITEFILEGATHER**
- **Msg 5144**
Autogrow of file '<file>' in database '<database>' was cancelled by user or timed out after <n> milliseconds. Use ALTER DATABASE to set a smaller FILEGROWTH value for this file or to explicitly set a new file size.
- **Msg 5145**
Autogrow of file '<file>' in database '<database>' took <n> milliseconds. Consider using ALTER DATABASE to set a smaller FILEGROWTH for this file.

Purpose

My purpose today is to give you 3 different tools to help you prevent and diagnose issues with disk space and database growth.

Agenda

- Quick intro as to how I problem solve as a DBA
- Disk Free Space collector
- Database File Size collector
- File Growth collector

First Steps – Problem Solving

1. What question are you trying to answer?
2. How can I get the data to answer that question?
3. How will you use/query that data to answer that question?
4. Are there other questions I may be able to answer with the same data?
5. How often do you need to collect that data to answer the question(s)?
6. How long will you need to keep that data to answer the question(s)?

How much space do I have left on my disks?

- Where do we get the data? Xp_fixeddrives
- How will I use it? Insert it into table using a stored procedure and query it
- Any other questions I can answer? Trends over time, differences between disks, etc.
- How often to collect? Once a day
- How long to keep the data? 180 days



How much space do I have left on my disks? DEMO

How big are my data and log files and how much free space is available?


- Where do we get the data? Sys.master_files and the FILEPROPERTY function
- How will I use it? Insert it into table using a stored procedure and query it
- Any other questions I can answer? Trends over time, differences between data files, free space, etc.
- How often to collect? Once a day
- How long to keep the data? 180 days



**How big are my data and log files and
how much free space is available?
DEMO**

How often are my files growing and what is causing them to grow?

- Where do we get the data? Extended events
- How will I use it? Insert it into table using a stored procedure and query it
- Any other questions I can answer? Commonly run queries that cause growth
- How often to collect? Once a day
- How long to keep the data? 180 days



**How often are my files growing and
what is causing them to grow?
DEMO**

Summary

- State the question you are trying to answer.
- Determine if and how you can get the data to answer that question.
- Determine how you will use that data to answer your question.

Summary (cont'd)

- Think about if this data may be able to help you answer any other questions now or in the future.
- Determine how often you need to collect this data.
- Determine how long to keep the collected data.

Links!!!

- PREEMPTIVE_OS_WRITEFILEGATHER
 - (Kendra Little) – http://www.brentozar.com/archive/2014/02/preemptive_os_writefilegather-and-instant-file-initialization-ifi/
- Indexes/Heaps
 - Indexes - [https://msdn.microsoft.com/en-us/library/ms190457\(v=sql.120\).aspx](https://msdn.microsoft.com/en-us/library/ms190457(v=sql.120).aspx)
 - Heaps - [https://msdn.microsoft.com/en-us/library/hh213609\(v=sql.120\).aspx](https://msdn.microsoft.com/en-us/library/hh213609(v=sql.120).aspx)
 - Introduction to Indexes (Gail Shaw) – <http://www.sqlservercentral.com/articles/Indexing/68439/>
- Tables – See Database Design Stairway
- DMVs (Glenn Berry) - <https://sqlserverperformance.wordpress.com/2010/05/02/recap-of-april-2010-dmv-a-day-series/>
- XEs (Jonathan Kehayias)- http://sqlblog.com/blogs/jonathan_kehayias/archive/2010/12/01/a-xevent-a-day-31-days-of-extended-events.aspx
- XQUERY
 - <http://www.techrepublic.com/article/shred-xml-data-with-xquery-in-sql-server-2005/6140404/>
 - <http://beyondrelational.com/modules/2/blogs/28/posts/10279/xquery-labs-a-collection-of-xquery-sample-scripts.aspx>
- Stairways for all of the above - <http://www.sqlservercentral.com/stairway/>
- How Online Indexing Works - [https://msdn.microsoft.com/en-us/library/ms191261\(v=sql.110\).aspx](https://msdn.microsoft.com/en-us/library/ms191261(v=sql.110).aspx)
- Documented XPs - <https://msdn.microsoft.com/en-us/library/ms187389.aspx>

Thanks!!!



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