SQL Server: Advanced Corruption Recovery Techniques

Module 1: Introduction

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Why Is This Course Important?

- **Corruption does happen, many times per day, all around the world**
  - Many people don't realize they have corruption until too late
  - Many people don't know what to do when they do have corruption
- **We covered the basics in the *SQL Server: Detecting and Correcting Database Corruption* course**
- **This course is about more advanced topics and techniques**
  - Things you don't see every day
  - Things outside your comfort zone
  - Real last resorts

What Sometimes Happens When Corruption Recovery Doesn't Work?

- Image from http://commons.wikimedia.org/wiki/File:Panic_button.jpg

Real-World Example

- **Story**
  - Database and application down for 3 days after corruption
  - Database stores stock trades for UK customers of a large US-based bank
- **Cause**
  - They started DBCC CHECKDB but decided to stop it after ten hours
  - They started to restore from backups but found they were corrupt after 13 hours
  - They re-ran DBCC CHECKDB again and let it complete, which took more than 30 hours
- **Resolution**
  - Eventually they found it was a single nonclustered index corruption that could have been fixed with an index rebuild
- **Cost**
  - The customer was fined for having the stock trading system offline
- **Lessons Learned**
  - Always let DBCC CHECKDB complete
  - Validate backups
  - Don’t panic!

Practice Makes Perfect

- **If you're recovering from a disaster, or helping a client recover from a disaster:**
  - You must know what you're doing
  - You must have practiced
  - You must NOT make things worse
- **Most of you have restored simple backups or run DBCC CHECKDB, but there are some things that most people have not done**
  - These are the things that will set you apart from others
  - Your colleagues and clients will love you if you can save them from a disaster while minimizing downtime and data loss

Root Cause Analysis

- **No matter what method you use to recover from corruption, you should always determine why it happened to avoid future problems**
- **It may be obvious what happened**
  - E.g. a known SAN problem or power failure
- **You may have no idea what happened, so what to do?**
  - Google/Bing for the corruption message you saw
  - Run I/O subsystem and server memory diagnostics
  - Examine the SQL Server error log and Windows event logs for clues
  - Check that firmware is up-to-date
  - Investigate NTFS filter drivers
  - Possibly contact Microsoft Customer Support for assistance

Why Can I Teach This Course?

- **I spent 9 years on the SQL Server team in Microsoft, from 1999 through 2007, as a developer, and in various management roles**
- **From 2000 to 2003 I was the developer responsible for DBCC CHECKDB (and the rest of the 130+ DBCC commands)**
  - Rewrote much of the consistency checking and repair code
  - Added consistency checking capabilities for new SQL Server 2005 features and data structures
  - Fixed hundreds of repair bugs
- **I've been involved in more than a thousand cases of corruption over the years, and have advised countless people over email, Internet forums, and our consulting clients**

Course Structure

- This course applies to all versions of SQL Server from SQL Server 2005 onward, except where noted
- This course assumes you have already watched my *SQL Server: Detecting and Correcting Database Corruption* course, and have some experience with SQL Server administration
- Module 2: DBCC CHECKDB internals and performance
- Module 3: Useful undocumented DBCC commands
- Module 4: Dealing with transaction log problems
- Module 5: Advanced restore techniques
- Module 6: Advanced repair techniques