SQL Server: Deadlock Analysis and Prevention

Module 5: Analyzing Deadlock Graphs

Jonathan M. Kehayias
Jonathan@SQLskills.com

pluralsight
hardcore developer training

Introduction

- **The deadlock graph generated by the lock monitor contains the information necessary for understanding the cause of the deadlock**
- **The deadlock graph information is the same regardless of the method of collecting the graph**
  - The Extended Events XML graph has some differences but they do not affect interpretation of the data contained within the graph

- **In this module we'll cover:**
  - Reading the deadlock XML
  - Viewing deadlocks graphically

Deadlock Graph Sections

- **“deadlock victim” – provides the “process id” of the process that was selected as the victim and rolled back**
- **“process-list” – list of the processes that participated in the deadlock**
  - The entry for each process contains information including the “process id”, waitresource, spid, priority, isolationlevel, inputbuf
- **“resource-list” – list of the resources that were involved in the deadlock**
  - The entry for each resource contains identifying information, the “process id” of the owner and the “process id” of the waiter, and the lock modes that were granted and being waited for

Interpreting the Information

- **Identify the victim process from the graph**
- **Using the resource-list, identify the resources involved**
  - Are multiple resources involved?
  - Are different granularity locks involved?
  - What lock modes are being used?
  - Are there any exchangeEvent entries?
- **Review the processes in the process-list**
  - Are the processes from different spids?
  - What isolation level is being used by each process?
  - How much transaction log was generated by each process?
  - What is the deadlock priority for each process?
- **Sometimes drawing out the resources on paper and the locks involved by each process can simplify understanding the cause**

Graphical Display in Profiler/SSMS

- **Profiler displays the deadlock information graphically for easier analysis of the lock resources held and the processes that participated in the deadlock**
  - The victim process will be crossed out
  - Hovering the mouse over the process graphic will produce a tooltip with further information about the statement being executed by the process
- **Deadlock events can be extracted from the trace data to XDL files for further analysis in SQL Server Management Studio**
  - The deadlock graph is still in XML format, the XDL extension is associated with the graphical representation in Management Studio only
  - Deadlock graphs captured by trace flags or Extended Events cannot be opened graphically

Third-party Tools

- **Deadlock analysis is not confined to the native capabilities in SQL Server**
- **Third-party tools like SQL Sentry Performance Advisor, provide alternate methods of viewing the information contained in the XML deadlock graph**
  - The information for each process is displayed in a tabular format making it easier to read
  - Additional information collected from other monitoring is merged with the XML deadlock graph information when available
    - E.g. the ShowPlan XML may have been collected for the sessions participating in the deadlock
  - Customized graphical representations of the deadlock can make understanding the deadlock easier

Summary

- **The deadlock graph is divided into different sections that provide information about the processes and resources involved in the deadlock**
- **The XML deadlock graphs can be saved as an XDL file to allow Management Studio to graphically represent the deadlock for easier analysis**

- **The next module will look at:**
  - Example deadlock scenarios