Custom Monitoring your Database with PL/SQL

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Know Your Audience

Let's see who's in the audience today.

» How many are DBAs? Developers?
» How many have written PL/SQL?
» How about a package and body?
» How many have created a DBMS_JOB?
» Who knows what SQL/PL is?
Why This Presentation?

* Repetitive tasks are tedious and boring.
* Not a good use of your time
* Yet are often essential in certain circumstances
  * Watching for a problem
  * Monitoring for a condition or event
  * Troubleshooting
So What’s the Solution?

Automation via DBMS_JOB

- Runs whenever database is open
- Access to PL/SQL procedures for logic

Not without its difficulties:

- Input/output difficult
- Job can “break”
Design Concepts

PL/SQL package implementation

- Compiled code for rapid execution
- Public and private procedures
- Multiple procedures in one block of code
- Output from DBMS_Job can be difficult

- Resolved by private "sendmail" procedure"
Design Concepts

Table driven “sendmail” procedure is essential

- Monitoring useless without notification
- Email is ubiquitous - not site specific
- Can also talk to most pagers and cell phones
- Worker procedures call private Sendmail with Message_type
Sendmail Details

- Implemented as a private procedure inside body
- Controlled by 3 column table

create table {unique name to package}

(email_address varchar2(50) not null,
message_type varchar2(8) not null,
message_body varchar2(250) not null) ;

- Supports multiple email addresses per message_type
- Message_body contains fixed text
Sendmail Details

- Opens cursor based on Message_type
- Has internal mail_line procedure to write 1 line
- Simple version in Appendix 2 of paper
  - Hardcoded subject and message body
- More complex, multi-line version in Appendix 1
  - Accepts an array for the message body
- Well tested - just use “as is”
Why use Case Studies?

• Problem/Solution format
• Meant to be examples, not finished modules
• Intended to be thought provoking
• Good teaching technique
Case Studies Covered

1. Row Locking and Waiters
   a. Row locks on a table
   b. Enqueue waits

2. Watch for an individual SQL statement

3. Standby Database Log Shipping

4. Detecting Missing Standby Logs
Monitoring Row Locking

Problem:

* Observed a condition where Websphere transaction was updating MATUSETRANS table but not issuing Commit and going idle

* Infrequent occurrence and hard to track to log files unless detected quickly

* Needed accurate session information
Monitor Row Locking

Solution:

- Create a package and body to watch for idle sessions with lock on this table
- Create a DBMS_JOB to call it
- Procedure to send email when situation detected
Monitor Lock Waiters

Problem:

- Occasional transaction backlog due to record locking
- Often caused by manual script with no COMMIT
- Required prompt identification to avoid major impact on application response time
Monitor Lock Waiters

Solution:

- Create a DBMS_JOB to run every minute, looking for Sessions waiting on an ENQUEUE

- Send email with data about blocking session, current event, and what locks it holds
Watching for SQL Stmt

Problem:
- A user is running a poorly performing statement that is tying up DB resources and timing out
- Need to quickly locate session data when it starts
- Causes poor JVM performance until killed
Watching for SQL Stmt

Solution:

- Create a DBMS_JOB to run every 5 minutes, a session running a SQL with specific HASH value
- Send email with data about that session so source can be traced in the log files.
Standby Log Shipping

Problem:

- Firewall timeouts throwing away IP traffic
- Slow internet connection to Standby
- Running “Mandatory” fixes firewall but puts Primary DB at risk of stalling due to lack of available redo logs
Standby Log Shipping

Solution:

- Set Log_Archive_Dest_2 = Mandatory
- A PL/SQL job to run every 5 minutes to watch “archived” status of redo logs. Possible actions:
  - Change destination to Optional if nearly full
  - Defer destination if < 2 available redo logs
  - Re-enable destination if Defer’d and caught up
Missing Standby Logs

Problem:

- When Standby “Optional” archive log may be skipped due to network error
- RMAN purges archive logs once backed up
- Result: Standby unable to FAL missing archive log
Missing Standby Logs

Solution:

- Monitor v$archived_log for redo logs sent to Dest 1, but not Dest 2
- Send email if archive log has not been sent to standby in over “n” minutes”
Concluding Comments

- I hope you found the use of Case Studies useful
- PL/SQL packages can do a lot!
- Does not take sophisticated programming
- Use my code as a template for your jobs
- Did this inspire some use cases in your job?
Contact Information

It’s been my pleasure to share this technique with you.

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