

MONITORING AND AUTOMATION

INTRODUCTION

Meet Frank.

Frank is overwhelmed keeping up with his SQL Servers. He has a mild case of RSI from all the clicking he does and spends a good part of each morning 'checking the servers'.

Frank is DBA who has come up the ranks from the software development side. He doesn't get much chance to pal around with the server guys in his office - and they are busy enough managing the SAN, updating machines, building new SQL servers for Frank as well as putting out their own fires. He could probably learn some tricks from these guys.

This is no way to live.

Things can be better for Frank and we are going to look at a few ways he could start to feel more confident that he is doing his job well.

INTRODUCTION AND THANKS

SAM GREENE

I'm Sam Greene, a DBA for a valley city. I work on a team of two that manages about 30 database and reporting instances and about 700 databases. I'm definitely not a SQL Server expert, but hope to share my experience managing a medium sized group of SQL instances. I've been working as a proper DBA for about 6 years now and have been using the monitoring system I'll be describing for about 5 years.

RODNEY LANDRUM

I'd like to thank Rodney Landrum, a DBA who wrote an SSIS package I based much of this system on. He laid the groundwork for me and I would not have done it without his prior work.

Since the time I adopted and customized his package, he has released a book with a new and improved package. I highly recommend you read his book.

WHAT WE NEED TO DO

DBA 101

There are several things every DBA should be doing.

Ensuring databases can be recovered.

Keeping your systems secure.

Making sure your services are up.

Ensure jobs are running.
Keep an eye on the error logs.
Monitor for performance and OS issues.

MORNING ROUTINE

You could do much of this every morning.
You'll quickly run out of time or energy to keep it up.
Notifications can also alert you to failed jobs and errors, but they can be deactivated or missed during setup.

THE PLAN

AUTOMATE (GATHERING OF INFO)

We will automate this information gathering to a central place - the DBA Repository, so we can be alerted of issues and make decisions. automate (reports and notifications). SQL Server stores lots of information in the system databases that we can make use of.

AUTOMATE (REPORTS AND NOTIFICATIONS)

We can use reporting tools or build applications that use the repository data.

Reports can be scheduled and sent to us as needed, or a dashboard can be built to show us system status.

Aside from giving us assurance that we are doing the DBA 101s this data will also help us make decisions.

These decisions can be tactical or strategic - how to plan our morning or how to plan disk space for the next 2 years. We can turn this massive amount of data we are collecting into a valuable tool for planning.

THE PAYOFF

PEACE OF MIND AND MORE TIME

After this is all set up and tweaked for his environment, Frank is going to benefit. He'll have a grip on his entire environment, he'll be able to report information about it quickly and he'll now have a certain swagger to his step.

GETTING IT DONE

BUILD OR BUY?

Lots of tools. Benefits of 3rd party. There are loads of tools for monitoring SQL server and the Windows operating system. One or more of these tools may be a great choice for you. A vendor supported package

will be up and running quickly and will be supported by a crack team of coders in most cases. Run through the ROI and see if these are appropriate.

Today, I'm going to take a look at what we did at my job, which is not a paid vendor supplied package.

THE TOOLS

The solution based on the SSIS package I mentioned by Rodney Landrum.

The SSIS package loads data from SQL Server into the repository.

Reporting services sends us reports each morning and lunchtime.

Another SSIS package also sends queries to all of our database instances to make sure they are responding in a timely manner.

THE ENTERPRISE POLICY MANAGEMENT FRAMEWORK

One final line of defense is the Enterprise Policy Management Framework, which uses the SQL Server Central Management Server to check that instances adhere to a set of policies.

ZABBIX

It also involves an open source tool called Zabbix.

Zabbix queries services and monitors operating system information.

A QUICK INTRO TO ZABBIX

Open source monitoring tool which can run on UNIX-like systems. AIX, FreeBSD, HP-UX, Linux, Mac OS X, NetBSD, OpenBSD, Solaris

There is a VMWare appliance for evaluation.

Agent will run on Windows.

In Zabbix you will create a template for your hosts. This will contain items and triggers which will alert zabbix of possible problems.

Items can be anything you'd like to track - from ping to perfmon.

You'll configure Zabbix to take actions when the triggers meet certain conditions. Macros will let you substitute values in item names such as perfmon counters or service names. This is very handy for named instances, where perfmon object names will change.

You can create graphs and system maps.

You can monitor web pages for response time and download speeds.

Supports NTLM same signon.

Maintenance windows and alert escalations.

CONSISTENCY

You need to make sure all of your servers are being monitored.

Installation Script. In Rodney Landrum's book, he offers a script to run after you've installed a SQL server. It can set memory, set up DB mail and other things that get real old, real quick. I've modified it to register the server in the Repository and install maintenance scripts as well.

We have an install guide that outlines finishing steps such as adding a server to Zabbix and the SQL Server Central Management Server to take advantage of policy based admin and policy checks.

FULFILLING THE BASICS

ALL SERVICES ARE UP (SQL IS RESPONDING)

We'll cover this using two different methods.

Zabbix SQL. Zabbix will monitor SQL Server, SQL Agent, SSRS, SSAS and SSIS. Service names can be substituted by macros per host, which makes setup using the template very easy. Monitoring of specific services can be disabled if it's not installed on that server.

Zabbix OS. Zabbix will also monitor the operating system, keeping track of CPU load, free disk space and memory. If you'd like to add something, you simply add it to your zabbix template and it's added for all your hosts using that template.

4

SSIS Ping. SSIS will 'ping' all instances by running a job that loads a list of active instances from the Repository. We use an object variable to store hold them. A FOR loop executes a select @@version for each server in this list. This is done by making the server name in the connection a variable - each time we iterate on this loop, the connection is changed. If the server doesn't respond, error handling marks the server as down. At the end of the package, we send a notification of servers that have gone down since the last run. We also notify if servers have come back online. This package runs every few minutes on a monitor server. The same package runs on another server and monitors the monitor, using a server list of just one.

BACKUPS ARE HAPPENING

Olla Hallengren Scripts. We use the Hallengren scripts for maintenance and backups. Failed jobs will send an email. Emails can be missed deleted or lost.

Repository Load Job. This job loads information about the database instance, job status and the databases which reside on it.

Database backup status check. You may have seen a script floating around that tells you when a database hasn't had backups within a certain timeframe. I've adapted this query and am loading that information for each server. Some databases don't have to be backed up, so we have an exclusion table to omit those from a report with a **LEFT OUTER JOIN** with a **NULL** on the exclusion table.

Enterprise Policy Management Framework. We are very serious about making sure backups are happening so we use the EPM to report on instances and their adherence to our Policies stored on the central management server.

False positives. False positives are commonly raised, but backup exceptions are normally valid, so we just skip to that section and review periodically.

Fixing issues with policies. If there are any other issues showing up in the reports - they can be fixed easily. A policy can be checked against all servers and the issue can be resolved with a click. I did this the other week with **PAGE VERIFICATION** and **AUTO-SHRINK**.

RESTORES WORK

This is an area we could improve in practice. I've got a SSIS job that can loop through one of our backup configuration tables and pick databases to test a restore of. It will get the latest full backup and restore to a test server. Databases could be chosen at random until we hit a size limit and then restored. It is a good idea to test the application with the restored database.

Tape Backups. Our backup team does a good job of making sure things get backed up. Still we like to check that new servers have been set up properly and old servers keep trucking. We have a step in our install guide to notify the backup team and set a reminder to test the restore from tape in a week.

Could we script a restore from tape? Probably! A quick search turns up command line utilities for NetBackup. Using the repository and interrogating the MSDB, we could schedule test restores to run from time to time.

SYSTEM IS SECURE

Just examples, no details...

User rights.

Service Accounts using WMIC.

Failed logins. Commonly, event logs are forwarded to a security log monitoring application. The application would fire off alerts to security team members if multiple failed login attempts happened. You can gather your error logs using your Repository Load package and pull error logs - Rodney also covers this in his free eBook. Go Rodney. Splunk. We'll talk about this later...

JOBS ARE RUNNING

Standard Job. Every server should have jobs for maintenance and backup. Setup Script. These are created by our server setup script - also lifted from Mr. Landrum.

Pull Job History. The Repository package pulls the last execution status of each job on each server.

Report on Job History. We get a report each morning with failed jobs for all servers. We can then prioritize our morning and split tasks between team members to get all issues resolved quickly.

ERROR LOGS ARE REVIEWED

Setup Script. The installation setup script creates a standard set of alerts for severities 16 and above, so we get tipped off to any funny business pretty quickly.

You can gather your error logs into a Repository table as well, letting your report for login failures or aid you in troubleshooting.

SQL IS PERFORMING

Keep it simple. We tend not to go overboard on alerts. We monitor for CPU and memory issues with Zabbix, as well as some perfmon counters such as Deadlocks, Paging Stats, Active Connections and Logins per second. If we run into any problems we use perfmon, profiler or another third-party tool. This is an area where third-party products can shine - performance monitoring is hard!

Alerts. We send alerts on a few of these, but performance by server varies and baselining manually is hard - a weakness of this system.

You can extend the Repository load package to load DMV

Future trending. Capturing server performance and user load lets you plan for your future hardware needs. Disk space, CPU etc.

WEB PERFORMANCE

Zabbix can monitor web URLs. You can work with application teams to set these up and get the full picture of whatever service you are supporting.

DBA, the missing link. As a DBA you float between hardware and software and often have contact with application and infrastructure teams. Using a tool like Zabbix, you could orchestrate a monitoring coup in your organization..

FAILOVERS?

How can we monitor failovers? Check the event log for service starting back up? Powershell?

REVIEW

IMPROVEMENTS

Adding SQL statements to the SSIS package can be a chore - you've got to deal with double-quoting everything inside a string.

Maintenance windows.

Thinning of old data.

Variation in installs generate false positives in EPM.

WEAKNESSES

SQL Monitoring SQL - just sounds wrong!

Can be time consuming. Go with a third-party if it makes sense.

Can be a little complex for a newcomer to sort out.

False sense of confidence. Something will go wrong. Do a reality check from time to time.

FRANK

And will all of that, hopefully Frank stays a happy and employed DBA.

LINKS

ZABBIX

[HTTP://ZABBIX.COM](http://zabbix.com)

ENTERPRISE POLICY MANAGEMENT FRAMEWORK

[HTTP://EPMFRAMEWORK.CODEPLEX.COM/](http://epmframework.codeplex.com/)

TACKLEBOX BOOK

[HTTP://BIT.LY/JTZ0R5](http://bit.ly/jtz0r5)

BACKUP AND MAINTENANCE SCRIPTS

[HTTP://OLA.HALLENGREN.COM/](http://ola.hallengren.com/)

WEAKNESSES

MAINTENANCE PLANS SUCK IN A GOOD WAY

<http://www.brentozar.com/archive/2012/04/maintenance-plans-roombas-suck-good-way/>

PEOPLE MAKE POOR MONITORS OF COMPUTERS

<http://www.macroresilience.com/2011/12/29/people-make-poor-monitors-for-computers/>

WHO IS THAT STICK GUY?

[HTTP://BIT.LY/A2OCID](http://bit.ly/A2OCID)