Kelverion
Best Practice Guide

Using a Persistent Data Store

5/24/2013

History			
Version	Modified By	Date	Description
1.0	Mark Ball	May 24, 2013	Final Release
1.1	Mark Ball	June 10, 2013	Updated Branding

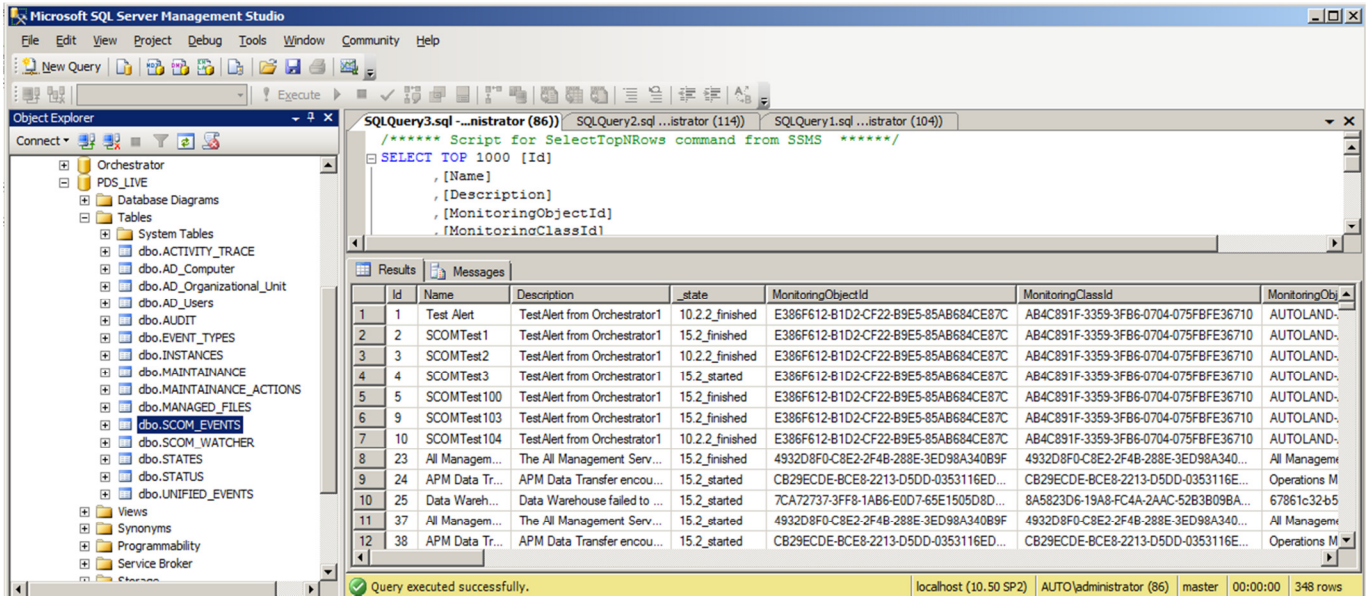
Summary

It is Kelverion's recommendation that in nearly every case runbook automations be implemented utilizing a small backend SQL database table or set of tables. This document explains why we make this recommendation.

Persistence

The ORCHESTRATOR data bus is extremely powerful but it is not persistent. This means that if the ORCHESTRATOR runbook server were to reboot or the services were to crash all data about executing runbooks would be lost. So a complicated multistep workflow that is counting on the data bus for its current state would need to be restarted manually by an administrator. That administrator would potentially need to take significant time to understand what parts of the workflow had run successfully and what parts were still needed. If a persistent data store is used at the backend, the last successful step in the process has been recorded in the database with all necessary information to continue the next step.

Fig 1: Kelverion's SCOM 2012 Connector PDS



Passing Data Efficiently Between Runbooks

Information gathered and generated in a given runbook is not available to other runbooks in ORCHESTRATOR without implicitly passing that data though the Invoke Runbook activity. In that method every data type needs to be defined in the destination runbook as well as the Invoke Runbook activity. This means passing large amounts of data between runbooks is a time consuming and error prone process. By writing the data to a SQL database at the end of each runbook the data can be passed by simply supplying a secondary runbook the primary ID of that row in the database. This also allows runbooks to act on data collected from multiple other previous activities. In the case of a step that sends out a final status email it would only take a pull from the database to retrieve the status of all the previous steps and include their data in the notification.

Fig 2: Passing Data between Runbooks Directly

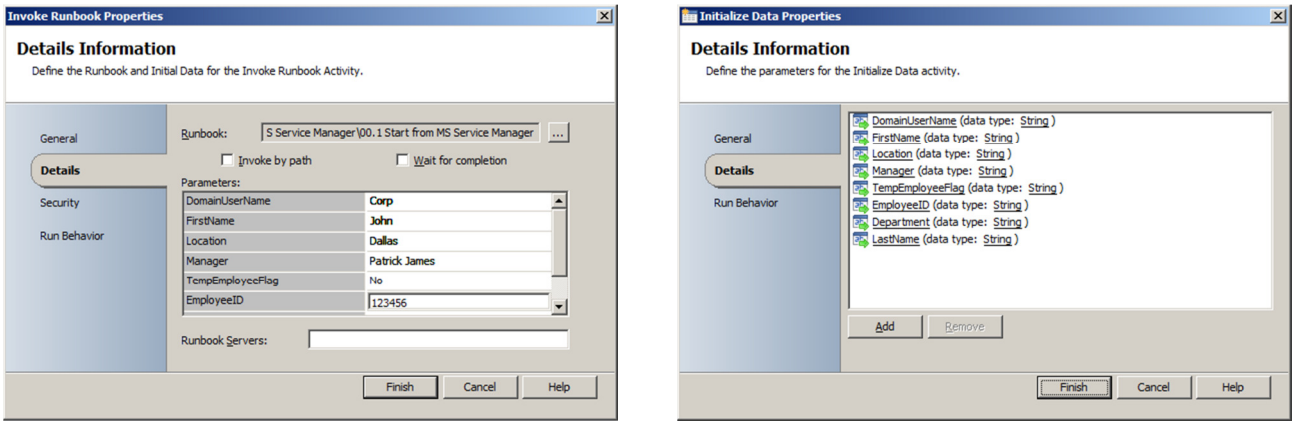
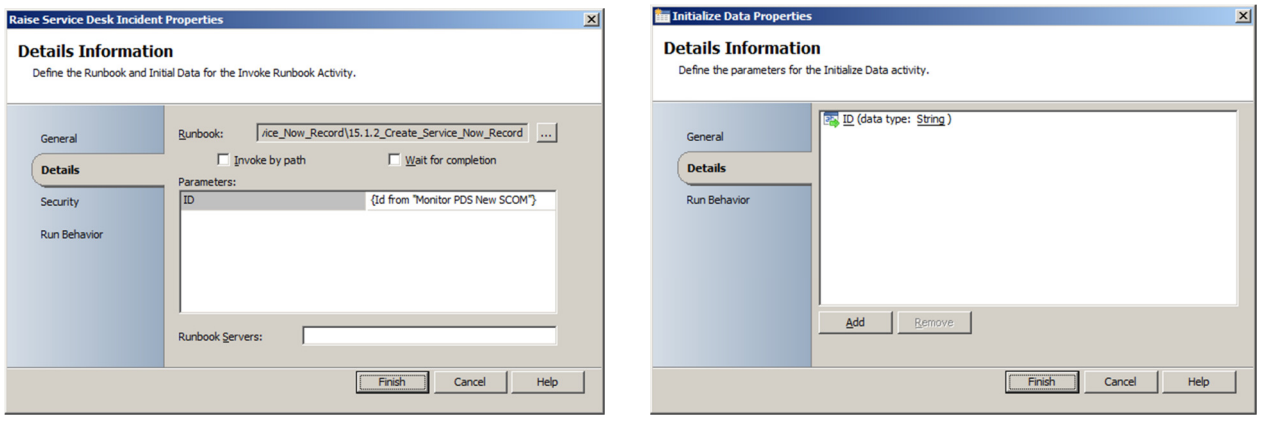


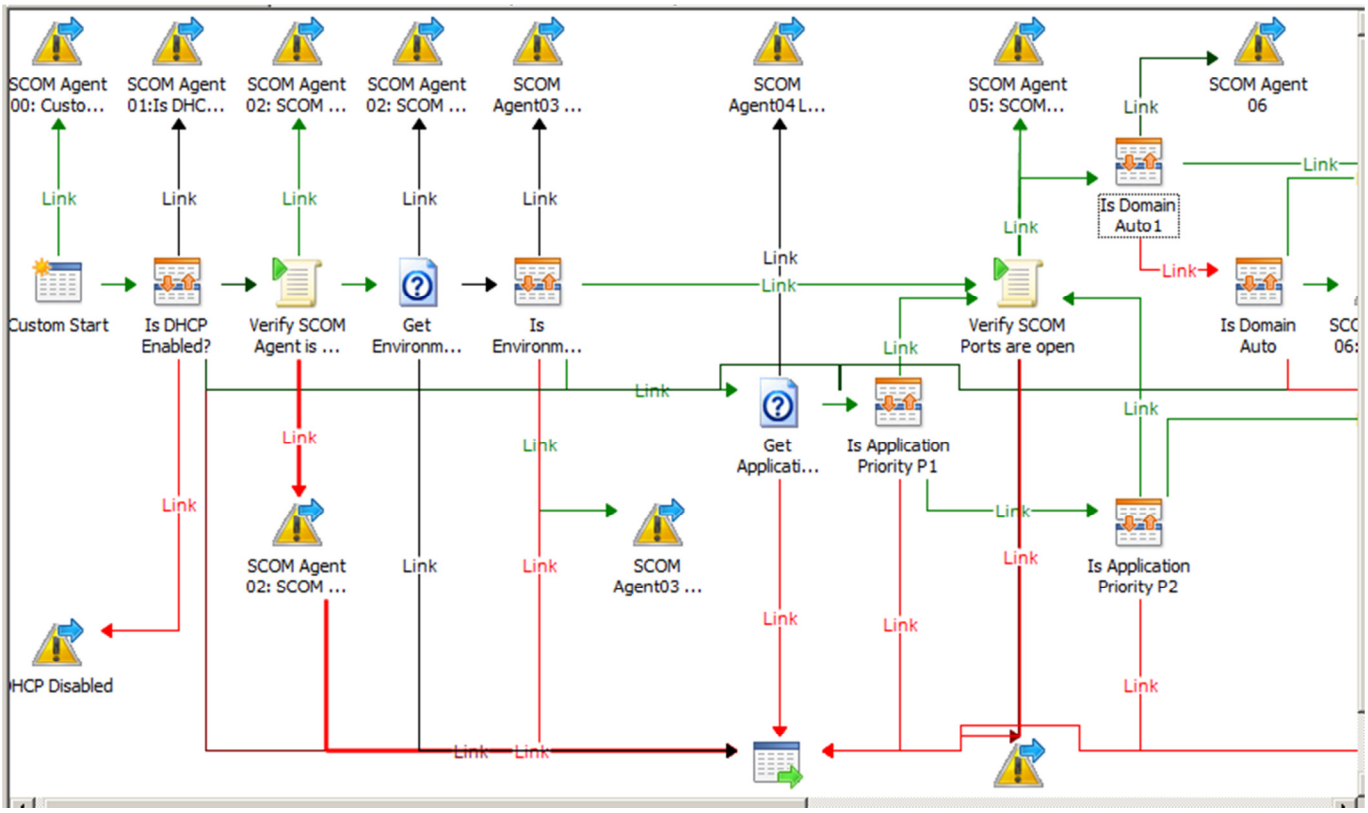
Fig 3: Passing Data Using a Persistant Database



Manageability

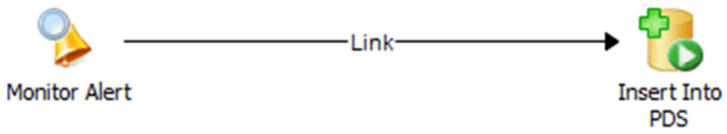
Because of some of the limitations inherent in the data bus; runbooks written without a database methodology tend to be large and harder to manage. This is an example of such a runbook:

Fig 4: Example Runbook without a Persistent Data Store



By using a database at the backend of a runbook process we are able to make smaller more manageable runbooks. These runbooks can handle smaller tasks and then pass the data reliably to database and then another concise runbook can pick it up from there. This makes it significantly easier to add, remove, or change an existing workflow.

Fig 5: Example Runbook using a Persistent Data Store

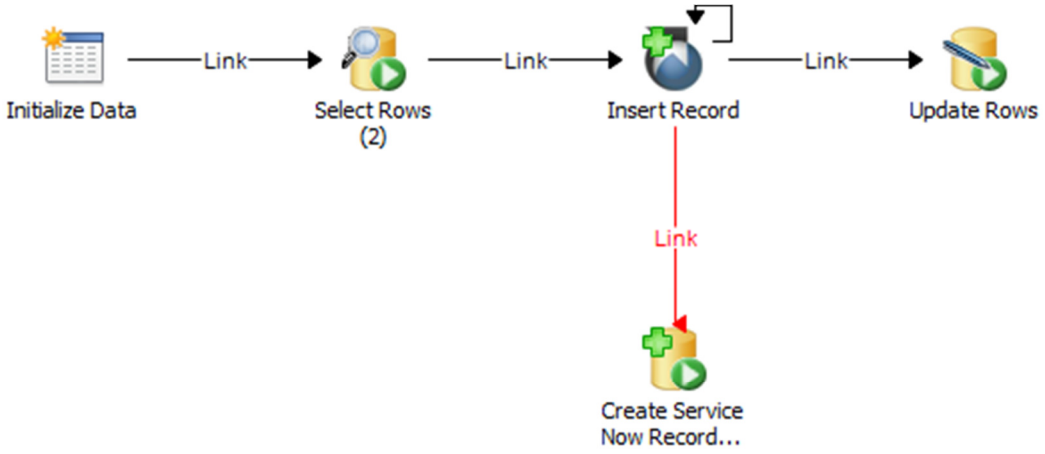


Re-Running and Troubleshooting Runbooks

The use of a persistent data store makes re-running a step in the process significantly easier and in some cases (See Figure 4) even possible. Consider the examples given in Figure 2 and Figure 3. If we needed to re-run the process shown in Figure 2 manually, we would need to acquire all of the new user information and then type that data into the Runbook Tester. In Figure 3, where the data is stored in a database, all we would need to re-run the process is the "ID".

Figure 6 below shows how Kelverion structures many of its runbooks when using our best practice. The Initialize Data activity is receiving the ID of a table row from another runbook. The data from that table is then made available on the data bus by the Select Rows activity. In this example the Insert Record activity from Kelverion's Integration Pack for ServiceNow uses the data to create a new ticket. Kelverion's Updated Rows activity is used to record the success or failure of the task. Additionally, the information from the Insert Record activity, like the ticket number, can be added to the data set.

Fig 6: Example Best Practice Runbook

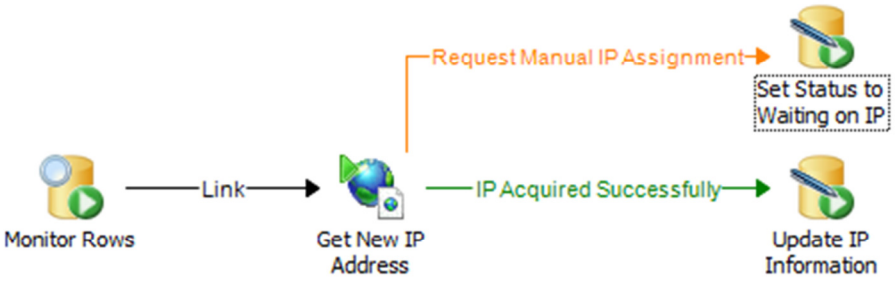


Waiting and Manual Intervention

Without a way of storing information outside data bus the original data and any new data collected as the current runbook executes must be passed on to the next runbook immediately. Many processes gather data that needs to be acted on at a later time. Additionally some steps in the process need to wait for an approval or manual intervention. Because all of the data needed to execute a runbook step exists in a persistent database; a step can be run now or at any future time reliably.

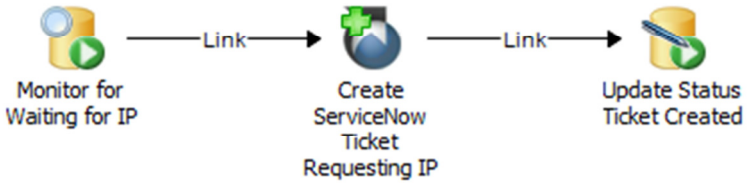
The runbook in figure 7 starts when the filter criterion for the Monitor Rows activity has been met for a given row. Usually the monitor is looking for a status column in the table to be equal to a specific value. This runbook then uses a REST call to request an available IP address to assign to a new server. If the IP address is provided then it gets recorded back to the database along with a new status that will kick off the next step. If the IP address is not provided the process does not need to fail. The status of the process is set to a value that will in turn run a process that notifies the appropriate team that an IP address is needed and then once the IP address is provided the process can pick up where it left off.

Fig 7: Runbook Example with Manual Intervention Option



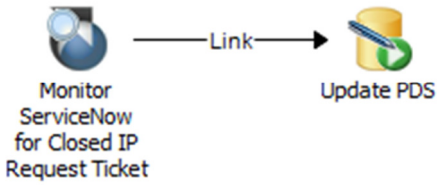
The manual intervention could be handled through the company's ticketing system. In figure 8 the information from the PDS is used to create a ticket and request an IP Address from the correct team.

Fig 8: Create a Service Desk Ticket



A runbook would then monitor that type of ticket for closure. The closed ticket should contain the new IP address. The address will then be written in to the database with an updated status. That status would be the same as if the runbook in figure 7 had successfully found an IP. Whatever runbook would normally come next would now execute.

Fig 9: Monitor for Closed Ticket



Error Handling

Error handling is one of the most critical aspects of good runbook design. Trying to handle errors in each runbook would add a significant amount of work and potential rework to each runbook. By creating an Alert Handling database table error information can be written from any runbook to this table. Administrators can be notified using a single runbook that looks for new entries in the Alert Handling table. This table would have historical error information that can help identify error trends in the workflow. Figure 6 shows and example of this approach.

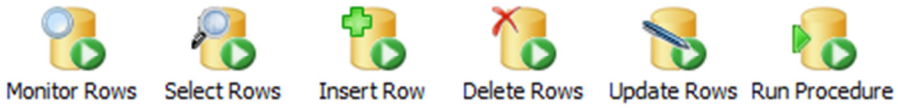
Speed of New Development

The process of developing new runbooks can be a time consuming process. One of the primary metrics to evaluate when deciding whether a certain automation project should be done is the amount of time it will take to build and maintain compared to the amount of time saved. Kelverion has found that using this methodology alongside our Integration Pack for SQL Server reduces the time to develop enterprise class workflows in Orchestrator by two thirds. If it takes less time to create, maintain, and update workflows many more tasks can be automated. The net result is an IT department that provides services more quickly, with greater consistency, for less cost.

Kelverion Integration Pack for SQL Server

The methodology described above is made most possible by the Kelverion Integration Pack for SQL Server. The method of using a backend database for runbook design can be partially accomplished with Orchestrator's built in Database Query tool but with significantly less efficiency and almost none of the time savings.

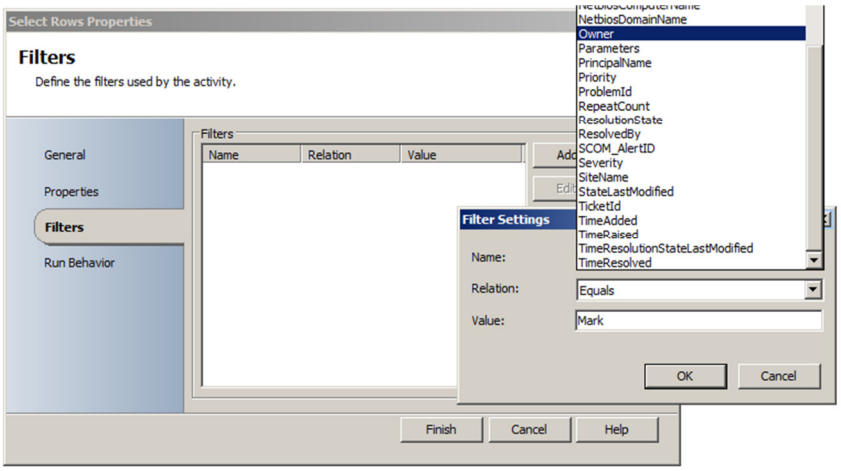
Kelverion's Integration Pack for SQL provides Orchestrator with the following activities:



There are a number of significant advantages the Kelverion Integration Pack provides over the built in SQL tools

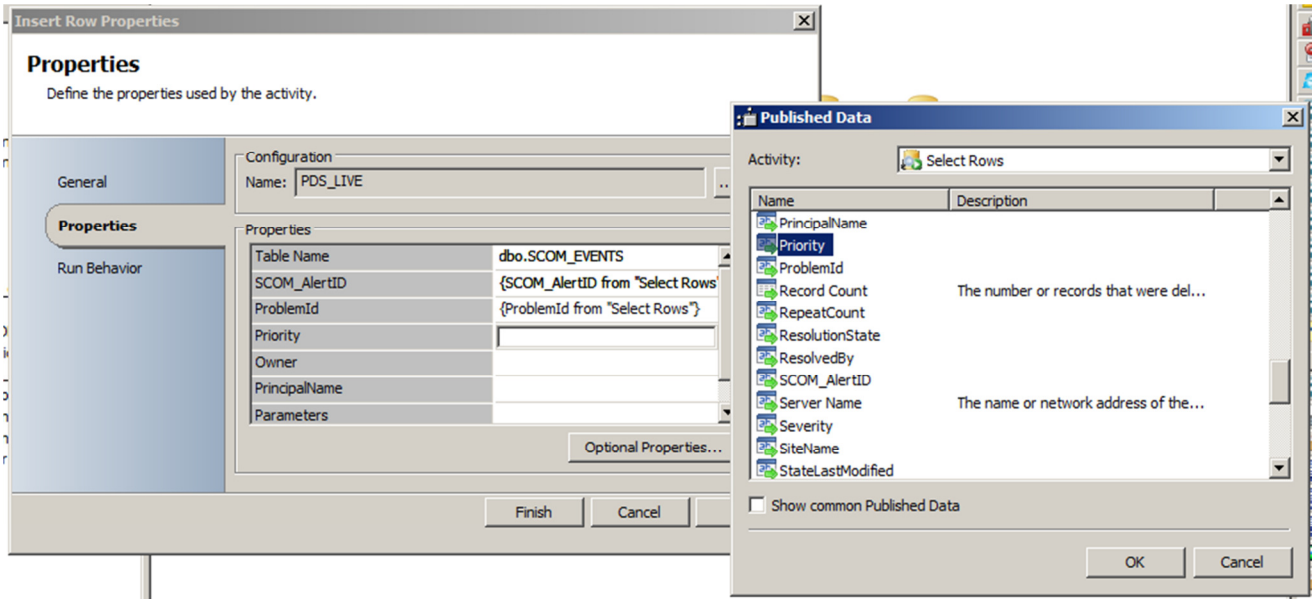
No SQL Code Required – All of the activities use a simple interface to monitor, filter, select, and update data. With the built in tools, SQL commands will need to be written and maintained for each activity.

Fig 10. Example of Select Rows Filtering



Published Data Doesn't Need to Be Parsed – Data retrieved from SQL by the built in tools is presented on the data bus as Comma Separated Values. This data needs to be parsed each time it is accessed before the data is actionable. Data retrieved by Kelverion's SQL activities are presented on the date bus already parsed and are represented by their associated column names. (Note: Kelverion's Run Procedure activity returns data in a raw format.)

Fig 11. Example of Published SQL Data



Efficient Communication with SQL Server – Each time the built in SQL activity executes it opens a connection, authenticates, take its action, and then drops the connection. This happens for each row. Kelverion's activities use connection pooling. Activities connecting to the same database use a single connection. That connection is only dropped if it is idle for more than 60 seconds. This significantly speeds up execution of large multithreaded processes and reduces resource utilization on both SQL and Orchestrator servers.

These are only a few of the advantages of Kelverion's Integration Pack for SQL Server. Please find out more about the power of the IP for SQL Server and request an evaluation copy at **www.kelverion.com**.