International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Workflow Limitations and Modernization

Mr. Ravi Kiran Kanneganti

Manager
Financial service
capgemini america inc

Abstract:
Many businesses rely heavily on business process management (BPM) systems to promote operational effectiveness, process flexibility, and customer content management. BPM combines business modelling, execution, monitoring and optimization of business processes, commonly integrating disparate applications, working groups and services into one platform. This paper describes limitations and modernization techniques that BPM is facing, and steps on how to remediate.

- There is no defined method to call service/external party and wait for the defined time for the response. Using the Workflow, we can call the service/external party, but not able to wait for certain time to get the response.
- Workflow doesn't have any audit logs that show to agent at what step in workflow got struck or waiting.
- Another big concern for the teams that are using the workflow/widget is limitation to automate these deployments.
- Many a times its difficult to analyze and summarize the conclusion of a document having multiple pages on a single document. Delay in taking decision as it's a manual process to go through the document. Workers who work on the disputes cases doesn't have 360- degree view of the history

In the below pages, I will share my experiences and how to fix these.
With the help of configurable workflow fields that can be read in run time, it gives more flexibility to the teams to update, pause or limit number of iterations.
By defining the milestone log messages, we can generate the reports for the users where exactly cases were struck and how many passed particular step in the workflows.
To automate the deployment of workflow/widget, we can leverage the CLI commands to run in the server. Hence we will have better control over the time taken and to know what steps are success and failure. Triggering the CLI Commands on the server to automate solution/Widget deployment, is a less time consuming and easy to use and have different options to generate logs and view the progress. We won't be requiring multiple teams like devOps and Release management teams. At times, we can validate the input fields/url's and can avoid manual errors.
To provide 360- degree view of the cases, we have defined a utility that gathers the data and uploads to share point. We have built AI Agent that reads this data and analyzes the data. AI Agent is designed to improve the process of managing and accessing enterprise content. This means that you will now perform natural language queries against your repository and easily apply AI to increase productivity. When critical information is hard to find, valuable time is wasted searching for answers and important decisions are delayed. It's time to revolutionize how you manage, search, and discover information. AI Agent uses artificial intelligence to respond to user's natural language inputs providing answers to questions, insights, and summaries of a document's content
AI Agent enables users to summarize lengthy documents and ask questions about a single document, set of documents, or an entire content repository. Increase the productivity of end users/clients. Making Confident Decisions with Full Traceability and Transparency. Streamlining Document Review Process.

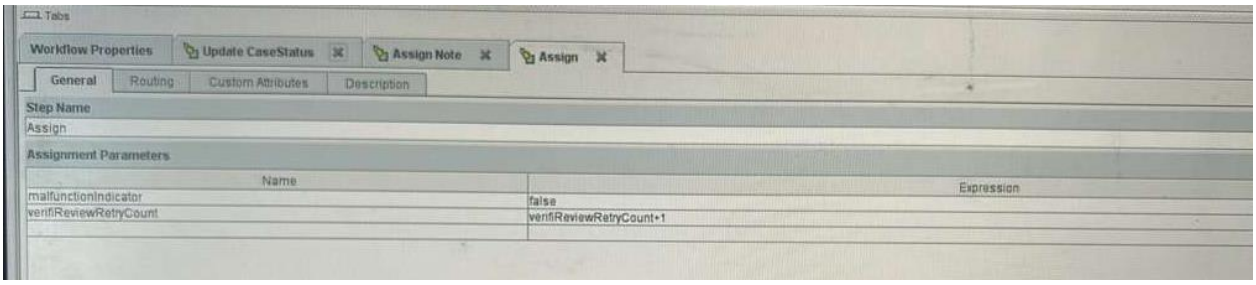
The proposed solutions are more effective than the usual static orchestration systems because it presents the idea of dynamically reading the parameters and can update them on need basis. Similarly defining milestone logs, will give is more scope to generate reports and can be sustained post workflow completion. Triggering the CLI Commands on the server to automate solution/Widget deployment, will be less time consuming and easy to use and have different options to generate logs and view the progress. We won't be requiring multiple teams like devOps and Release management teams. At times, we can validate the input fields/url's and can avoid manual errors.

Define definite time for the delay and process workflow

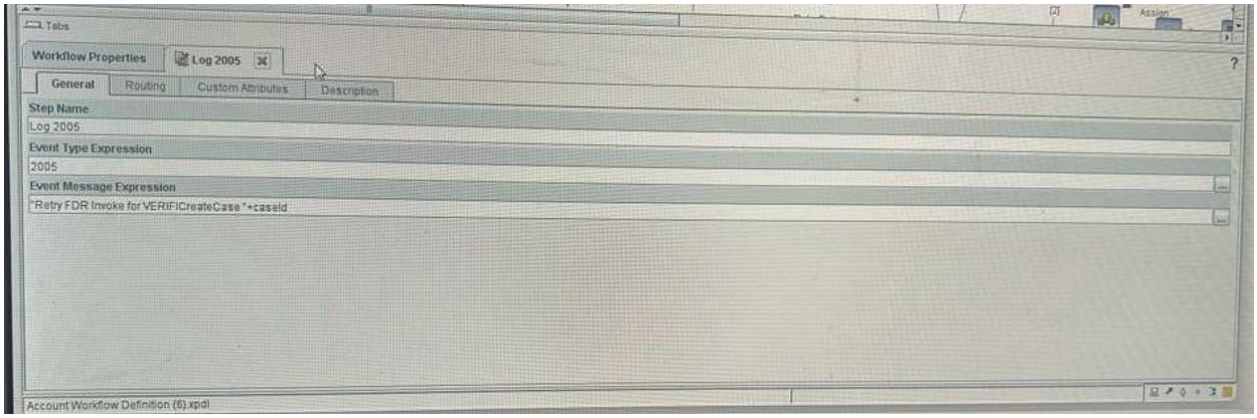
We can read the configurable fields from workflow definition and define the loop for the definite wait period. Workflow can wait for the minutes that are defined and will retry after the wait period. Below commands helps us to read configurable fields.

To query	Syntax
a roster, without selective query	wobquery <*rostername*> n <*display*> <*size*> <*verbose*>
a roster, with selective query	wobquery <*rostername*> {y <*indexname*> <*minfieldval*> <*getvaluesequalmin*> <*maxfieldval*> <*getvaluesequalmin*> <*filter*>} <*display*> <*size*> <*verbose*>
a queue, without selective query	wobquery <*queuename*> n <*display*> <*size*> <*verbose*>
a queue, with selective query	wobquery <*queuename*> {y <*indexname*> <*minfieldval*> <*maxfieldval*> <*filter*>} <*display*> <*size*> <*verbose*>

For defining the definite wait period, keep the loop with a variable that will be incremented each time and wait for the defined time(example 12 hour, 24 hours, 48 hours like that).
addhours(systemtime(), F_getRegionFieldValue("filedName", integer);
if(workflowfield=”null”, true, false)
if(strloc(configurable_field,".")=0,strins(configurable_field,".")+1))=1,strins(configurable_field,"0",len(configurable_field)+1, configurable_field)



Defining the logs after certain workflow steps will enable the end users to see the workflow milestones. vwlogs can we used to show reports, and these can be retained even after workflows are completed.



This has eased the client's perspective on the workflow and have asked the Proof of concept and that worked well and client has added 10 more resources to build the complex disputes automation workflow at synchrony.

Here is guidelines users should consider or avoid for cleaning the logs:

- Never put all major tasks into one single command such as -L -D -T –X for large VWLog tables. Major I/O will overkill the server and you will get sluggish response.
- Split them into small tasks by following practical Steps To Do.
- Each successful step will reduce the size of VWLog tables a bit. That helps later steps run more efficiently.
- Specify the start time -s and end time -e to limit volume of data at one time .
- Specify the batch size –b value, start with 3000, monitor system resource (memory usage), increase it (5000, 10000, etc.) accordingly, if the system resource allows. Keep in mind, based on –b value, vwlog will allocate a buffer large enough to work more efficient. The larger the buffer, the better performance. However users should not assign more than their available resources. The batch size is a tunable value, don't assign too much without testing.
- Avoid using –v, -H, -o when purging large data since the standard output will add up more I/O burden to the task and definitely slow down the performance.

B. Steps To Do

Here is practical steps users should follow:

IMPORTANT

The following steps should be done sequentially. Keep in mind, the order of execution steps from 1, 2 and 3 does matter. The main reason is we need to preserve the terminated event (EventType=165) until the last step. Do not skip.

For PA users, the safe approach is to prune events associated with Terminated WF and events already transmitted to PA (using -L –T options). Do not use –P unless specifically being advised by Engineering.

1. Purge statistic info using -X option. Repeat it for all regions.

The statistic info is stored in statistic table, not in VWLog, hence this action will not reduce the size of VWLog. The statistic info is accumulated over time, if user doesn't need it, they should remove it. This option is no longer applicable in Process Engine 5.x.

vwlog -r <region id> -X

2. Purge all Tracker objects associated with terminated Workflow

The Tracker objects reside in Roster and Tracker queue, not in VWLog tables. When the workflow

terminated, the Tracker object is no longer needed, hence it should be removed. The F_EventType 165 is used to indicate the WF already terminated resides on VWLog table. Without that critical info, the WF will be considered alive. We need to purge the Tracker objects prior to purging the data in VWLog table which is in step 3.
Purging Tracker objects will not reduce the size of VWLog tables.

vwlog -r <region id> -D -T -b 3000 -s <start time> -e <end time>

Note:

- -b for the block size default is 3000 records, increasing this value will speed up the pruning process, however make sure you have enough resources (RAM). Users might start it with 5000 and increasing it gradually.
- Assigning <start time> and <end time> helps to control the volume of Tracker object we deal with at a time. The suggestion is to start -s with oldest time, and -e with one month increment, Depending how much data we deal with within a month, users can open the time window to 2 months, or 3 months, etc.
- If users have custom event log tables, you might specify -t option, that's good practice to deal with single log table, one at a time. Without specifying the –t option, the vwlog command will be operated against the Default Event Log table.

3. Purge all events associated with terminated Workflow.
Do this step LAST, after step #1 and #2 successfully DONE.
This step, when succeeded, will actually reduce the size of VWLog default table.
vwlog -r <region id> -L -T -b 5000 -s <start time> -e <end time>

4. Purge System Event Type records
After step 1, 2 and 3 were done, use the -Z option to remove unnecessary System Event Type records.
vwlog -r <region id> -Z -s <start time> -e <end time>
This option can be used in conjunction with a start and end time (-s -e or -S -E), ignore PA (-P) and table name (-t). If no start and end time is provided then all of these types of items will be removed from the Event Log table.
The System Event types removed are: 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, and 340. Additionally, if -P is used events 265 and 266 will be removed.

C. Troubleshooting
Practical techniques for trouble-shooting the pruning issues or monitoring the pruning progress:

- Capture the count(*) of VWLog table BEFORE, DURING, and AFTER pruning task to confirm if the purging works or not.
- If the count(*) of rows doesn’t reduce, chance is VWLog table doesn’t have Terminated EventType 165 between <start time> and <end time>. Verify if there are some EventType 165 existing within the time window user specified.
- Without EventType 165, no events would be purged. This is expected behavior with –L –T option.
- Find out why the EventType 165 doesn’t get generated. Did the user turn it off? What was the reason behind that?
- DO NOT USE –P option without consulting with Engineering first. Find out if the user is using PA or not, -P purges all events and would not check if events were already sent to PA or not. In some cases, events are missing by wrongly using of –P, hence PA ends up with a lot of quarantined events.

- In case of Terminated EventType 165 is missing, -P would be considered, however we have to make sure the target pruning events must be transmitted to PA already (e.g. PA keeps up with the most current date without backlog).
- In order to find out the backlog, take a look on MostRecentTimeStamp on the PA table X_PAPEEventState, its value should reflect the most current date and time.
- This basic query helps to find out if any EventType 165 existed: Select count(F_EventType), F_EventType from F_SW.VWLog<nnn> group by F_EventType;
- OR use this query to find out how many EventType based on specific time frame: Select count(F_EventType), F_EventType from F_SW.VWLog<nnn> where F_TimeStamp < [internal specified time] group by F_EventType;
- Match the event log name and physical table name. Specify the value of -t <event log name> is a good practice to verify data on the working table.
- Find out if Process Analyzer (PA) or Case Analyzer (CA) is enabled. If PA or CA is enabled, the output of vwtool's config command will show "Disable Analyzer Engine" set to "No". A "Yes" means PA/CA is disabled.
- If PA or CA is enabled, the vwlog will not purge events that haven't processed yet by PA/CA. This can often be the reason why vwlog isn't pruning records that you think it should be pruning.
- If PA or CA is enabled, the table VWPAEventState (on PE) contains the information about how far events have been processed by PA/CA for each particular event logs. The F_TimeStamp tells the time of latest event were processed by PA/CA. The vwlog only purge data older than the value of F_TimeStamp. The F_TimeStamp also tells if there is any backlog in PA/CA processing. The F_UpdateTimeStamp tells exact time the last data processing happened.
- In Process Engine 4.x, the vwtrace with dbaccess option enabled provides the best useful info to find out what the vwlog tool is doing. Search for any SELECT or DELETE statements on the physical table name of the VWLog table being worked on, Make sure you ignore any activities caused by non-vwlog tool activities that might cause the confusion.
- In Process Engine 5.0 (BPM 5.0 and BPM 5.1), the trace of vwlog tool is turned on via traceOptions file (under C:\Program Files\IBM\FileNet\ProcessEngine\data\pesvr.default* assuming Process Engine was installed on Windows platform, in default directory and the virtual server name is "default"). To turn on the database trace, users should un-comment the following options: TRACE_DBI_MSGS, TRACE_DBI_OUT, TRACE_DBI_TIME, and TRACE_DBI_TRAN by removing the leading "#" character. The output of vwlog trace files are VWLog_system.log and VWLog_trace.log (under C:\Program Files\IBM\FileNet\ProcessEngine\data\pesvr.default\logs* by default). The pesvr_trace.log doesn't contain any run-time info for vwlog tool.

For a good start of the investigation, the following steps should be helpful before engaging engineering:

1. The exact vwlog command and the time the command was issued.
2. The exact the errors if applicable.
3. Output of vwtool's config command to find out if Process Analyzer is enabled.
4. Output of vwtool's logconfig command to match event log name and physical table name.
5. Output of "select count(*) from <VWLog table>" BEFORE, DURING, and AFTER pruning task to confirm if the purging removed any records.
6. Output of VWPAEventState to find out if events are valid for pruning.
7. Look at the vwtrace/VWLog_trace.log output, search for SELECTs and DELETEs against the physical event log table name. Ignore non-vwlog activities such as vwtime, vwnotify, vwdone, etc. Basically, focus on vwlog activities only.
8. The vwtrace/VWLog_trace.log should shed light into what was happening. The SELECT against the specific event log might return 0 rows to delete. In that case, focus on specific filtered conditions of the SELECT and investigate why it's not finding any work to do.

- After deleting a significant number of event log records, general database maintenance suggests that rebuilding affected indexes and updating the optimizer statistics will help to improve performance. Note that a table that experience many updates and deletes may also require index regeneration and statistics updates.

Solution/Widget deployment automation

Ensure that you export the solution package from the development environment design object store and imported it to the production environment staging object store. Be sure to have your completed configuration checklists available.

Login to the server where cpe is installed. Change the current directory to the *install_path*/CaseManagement/configure directory. *install_path* is the location where Case Manager is installed.

Option	Description
AIX® Linux	By default, *install_path* is the /opt/IBM/CaseManagement directory.
Windows	By default, *install_path* is the C:\Program Files\IBM\CaseManagement directory for a fresh install or the C:\Program Files (x86)\IBM\CaseManagement directory for an upgrade.

If you want to create additional deployment configuration files in the same profile, generate an additional deploysolution.*n*.xml file by running the following command. Do not type any line breaks when you enter the command:

configmgr_cl generateConfig
-task deploysolution
-profile myprofile
-profileType wasproductionenvironment
[-silent] [-force]

-profile *profile*

Specifies the profile to use. The *profile* value can be one of the following items:

- The name of the profile, such as develop1. The profile is located in the *install_path*/CaseManagement/configure/profiles directory. *install_path* is the location where Case Manager is installed.
- The full path to the profile directory, such as "C:\Program Files\IBM\CaseManagement\configure\profiles\develop1" or /opt/IBM/CaseManagement/configure/profiles/develop1.
- The full path to the profile input file, such as "C:\Program Files\IBM\CaseManagement\configure\profiles\develop1\develop1.cfgp" or /opt/IBM/CaseManagement/configure/profiles/develop1/develop1.cfgp.

-profileType wasproductionenvironment

Specifies the type of profile and must be wasproductionenvironment for WebSphere® Application Server.

-silent

Optional: When you specify the **-silent** parameter, no prompts or informational messages are shown in the console, but the errors are written to the log. Failure messages and validation error messages are shown as

needed, such as messages about missing passwords or invalid port numbers. If you run the **execute** command to run all the tasks in a profile and you specify the **-silent** parameter, you must also specify the **-force** parameter.

-force
Optional and applies only when the **-silent** parameter is used. When you specify the **-force** parameter, the task is run without pausing for required responses to validation error messages, such as messages about missing passwords or invalid port numbers.
following command generates one deploysolution.*n*.xml files for the existing case deployment profile that is named deploy_solution:
configmgr_cl generateConfig
-task deploysolution
-profile deploy_solution
Edit the property values in the deploysolution.xml files that you generated in the case deployment profile:

a. Use a text editor or XML editor to open one of the configuration XML files that you generated.
b. Replace each occurrence of ****INSERT VALUE**** with a value appropriate for your site. See the descriptions in the file for more information and use your configuration checklists.
a. Replace empty values that have the format <value /> with a value appropriate for your site. Use the format <value>*my_value*</value>.
b. Verify that the default values for the remaining properties are correct for your site.
c. Set the **enabled** attribute value in the <configuration> tag to true in any configuration XML file that you edit if you want to run the configuration task. When a task is disabled, the **execute** command skips the task.
d. Save your edits and close the XML file.
e. Repeat as needed until you edit all the deploysolution.*n*.xml files for your profile.
c. Run the deploysolution tasks in the profile one at a time by running the following command. Do not type any line breaks when you enter the command:
d.

```
configmgr_cl execute -taskfile task_file_name
-profile myprofile [-silent] [-force]
```

Where *task_file_name* is the name of the task file: deploysolution.xml or deploysolution.*n*.xml and *n* is a number larger than 2.

1. Repeat 4 as needed for each deploy solution task file that you generated in this profile.
2. Optional: Assign users to the roles for this case:

a. Run the test command to assign users by running the following command. Do not type any line breaks when you enter the command:
b.

3.
```
configmgr_cl test -taskfile task_file_name
-profile myprofile [-silent][-force][-help]
```

a. Where *task_file_name* is the name of the task file: deploysolution.xml or deploysolution.*n*.xml and *n* is a number larger than 2.
The Case Manager Client opens for you to assign users to the roles for this solution.
b. Add users to the roles.
c. Repeat as needed for each deploy solution task file that you generated.

Below are the steps on how to create AI Agent

The following example shows a configuration with the required properties, where the ai provider is as a Service and is using the default auth-type IAM value. In the exemplified configuration:
The .ai project-id is 00000000-1111-2222-3333-444444444444.
The provider-url of the project-id is https://us-south.ml.cloud.ibm.com.
The authentication alias created in step 1 is ai_auth_alias.

```
<properties>
  <server>
    <gen-ai merge="mergeChildren">
      <project-id>00000000-1111-2222-3333-444444444444</project-id>
      <provider-url>https://us-south.ml.cloud.ibm.com</provider-url>
      <auth-alias>ai_auth_alias</auth-alias>
    </gen-ai>
  </server>
</properties>
```

The next example shows a configuration where the ai provider is ai software. In the exemplified configuration:

- The ai project-id is 00000000-1111-2222-3333-444444444444.
- The provider-url of the project-id is https://my-cpd.mycompany.com.
- The authentication alias created in step 1 is ai_auth_alias.
- The authentication URL is https://my-cpd.mycompany.com/icp4d-api/v1/authorize.
- The authentication type is CP4D.
- The SSL configuration name is MyNewSSLSettings.

```
<properties>
    <server>
      <gen-ai merge="mergeChildren">
        <project-id>00000000-1111-2222-3333-444444444444</project-id>
        <provider-url>https://my-cpd.mycompany.com</provider-url>
        <auth-alias>watsonx.ai_auth_alias</auth-alias>
        <auth-url merge="replace">https://my-cpd.mycompany.com/icp4d-api/v1/authorize</auth-url>
        <auth-type merge="replace">CP4D</auth-type>
        <ssl-configuration merge="replace">MyNewSSLSettings</ssl-configuration>
      </gen-ai>
    </server>
</properties>
```

Next step is to configure the agent, for the end user utilization:
Configure the SSL certificates before starting the container. If your Business Automation Workflow environment already uses certificates signed by your organization's internal or external CA, reuse the same certificates for the agent server. The certificate reuse ensures that browsers and the Workplace UI already trust both servers and eliminates the need to accept certificates manually.
Create an .env file in your installation directory. Then, configure the following environment variables in .env file.

```
#API credentials
URL=<your ai URL or CP4D URL>
API_KEY=<your API key>
PROJECT_ID=<your project id>
```

# For Cloud Pak for Data (if applicable)
# USERNAME=<your CP4D username>
# PASSWORD=<your CP4D password>
# TOKEN=<your CP4D token>
# INSTANCE_ID=<your CP4D instance id>
# VERSION=<your CP4D version>
# BAW Server URL
BPM_SERVER=https://<your-baw-server>:<port>

# Enable required agents
RUN_WORKPLACE_AGENT=true
RUN_AUTHORING_AGENT=true

# CORS settings for frontend integration
CORS_ORIGINS=https://<your-baw-server>:<port>

# Enable HTTPS
USE_HTTPS=true

SSL certificate and key files
If using Option 1 (organization certificates), uncomment and update filenames if needed:
CERT_FILE=./certs/server.crt
KEY_FILE=./certs/server.key
CA_CERT_FILE=./certs/ca.crt

# BAW_HOSTNAME=<your-baw-server> # Uncomment and set this when agent server and BAW server are on different machines
AGENT_HOSTNAME=<your-agent-server>

Optional: For federated environments
FDR_ENABLED=true
PFS_SERVER=https://<your-pfs-server>:<port>

Optional: For case features
CASE_ENABLED=true

Start the docker container.

1. Open wsadmin CLI, in \BUILT\deploy2\AppServer\bin and configure the Content Security Policy (CSP), then restart the server.
2. Verify that Workplace Assistant is installed by logging in to Workplace, going to a task, and checking that the assistant chat icon is visible in the interface. Click the chat icon to interact with the assistant.

Now that Workplace Assistant is configured, you can start using it in your work.

DECLARATIONS

Funding
This research received no external funding.

Conflicts of Interest
The authors declare no conflict of interest.

Ethical Approval
Not applicable.
Data Availability
Not Applicable
Authors' Contributions
- Conceptualization & Methodology: Kanneganti Ravi Kiran
- Software, Modelling & Analysis: Kanneganti Ravi Kiran
- Writing – Original Draft & Visualization: Kanneganti Ravi Kiran
- Review & Editing: Not Applicable

Acknowledgements
Not Applicable

REFERENCES:
1. Oracle - Identifying which Oracle Indexes to Rebuild http://www.dba-oracle.com/art_index1.htm
2. SQL Server - Reorganize and Rebuild Indexes, http://msdn.microsoft.com/en-us/library/ms189858.aspx
3. DB2 - How to determine if an index needs to be rebuilt, http://www-01.ibm.com/support/docview.wss?uid=swg21224901