Root Cause Analysis 4Q

Event's date: **Mar 30th 2023**

Title: **PWB Slowness and unable to print labels**

Event Description

Label printing issue observed and Production workbench appeared to be slow and it took more time to respond and thus unable to proceed scanning any serials

SR	Plant	Priority	Impact
5380102	E01	P2	PWB slowness observed and units unable to be scanned for Arista Customer in e01 Plant also problem observed while printing labels
5380303	K03	P2	PWB slow in processing and printing stuck
5380160	E30	P2	Delay in response from PWB while scanning the serials
5380344	E90	P2	All labels from MDS and LE labels are unable to print in e90_01_hpac site

Impact

Plants like E01, K03 & E30 reported production workbench slowness and it impacted productivity of the plant. Additinally Plants E01, K03 & E90 were unable to print labels

Known possible causes

Team confirmed with:	Possible Cause

Corrective / Containment Actions (short term)

Date	Status	Action
2023-03-30	Closed	1. First occurance, there are few stuck print jobs cancelled automatically by the script. Autoscaling also replaced bad HA instance with new one. 2. Second occurance, We had a bunch of printing pools triggered by one of the E02 printer via SRDC portlet. The printer was not reachable. We had to cancel the stuck job and then kill one of the bad HA instance which was triggering the call and also removed the printer from the LE admin.

Root Cause

We had 2 occurance with performance issue on the same day. Upon on checking HA and API instance with spikes and the print server had performance issues more than thrice onthe same day. We had 800+ jobs queued up and in then the print server resource utilization got increased. We had primtq processes running for more than 2 hours and thus the print server was not able to process the jobs.
For the first occurance, couple of bad HA and API instance caused the performance issue in the PWB. mes-api and print queue jobs
For the second occurance, one of the E02 printer was not online but user kept send repeated jobs. Later we had spool of request triggered from on the HA instance for the same printer.

Preventive Actions (medium and long term)

Date	Jira	Status	Action
2023-03-30	ONE	Open	Enhance the primtq monitoring script to cancel all the print jobs for the specific printer if the printer is unreachable. This will reduce the load against number of request spooled by the client
2023-03-30	MDS-4346	Open	Review the print queue server performance or any improvement in openjpql

Investigative Team

Team	Member	Role
Mes Support	Shimrey Liu	MES Supervisor
Mes Support	Ramesh Pichaimuthu	MES Supervisor

Chronology of Events/Timeline

Date	Time (US Central)	Event
2023-03-29	10:37 PM	E01 Plant reported they are having issues with PWB for Arista Customer by creating the SR
2023-03-29	11:06 PM	E30 plant reported they share the same issue as E01
2023-03-28	11:36 PM	plant K03 reported same slowness in stations PWB and test equipment for the eSic p2445tc1b
2023-03-30	12:15 AM	there was spike on API instance and the conduit service was restared by MES support team
2023-03-30	12:17 AM	All Plant confirmed it working ok
2023-03-30	12:20 AM	C00 plant reported the issue with MDS & LE label printing process
2023-03-30	12:52 AM	Plant e01 again reported issues with PWB
2023-03-30	1:13 AM	Additionally K03 and E01 plant reported issue with label printing as well
2023-03-30	1:16 AM	Found stuck print jobs for E01 printers, MES support cancelled it
2023-03-30	1:28 AM	K03 reported the printing issue due to too many active jobs in queue
2023-03-30	1:46 AM	Found stuck print jobs for E01, K03 & other plants like E91 's printers, MES support cancelled all those stuck jobs
2023-03-30	2:36 AM	K03 & E01 confirmed the production lines back to/ their without any issues to PWB and printing process.

Findings (evidences could be in seppearated tabs)

See the attachement

Event Description

This section provides a description of the event that is being analyzed. It provides a clear and concise description of the problem that triggered this Root Cause Analysis. It should state the date, time, detailed description of the event/problem, who detected the problem, who it affected, and how it affected them. It is important that the descriptions are as detailed as possible since this problem is the source of the entire RCA.

Impact

This section provides a description of the symptom that users faced during the outage including the estimated downtime.

Known Possible Causes

This section provides a description of other system issues that could cause the same symptoms. These possible causes must also trigger PREVENTIVE ACTIONS for each in order to minize the risk of face this problem in the future.

Corrective Action

As the purpose of the Root Cause Analysis is to determine the root cause of a problem, it should result in some corrective actions that may be taken to ensure the same problem is not repeated. These actions are the ones taken in order to temporarily mitigate the issue while final corrective actions are completed and implimented.

Preventive Action

Once investigation is completed, in this section the final root cause(s) of the issue must be listed.

Preventive Action

Actions defined to be taken as a fix for the root cause and in order to prevent new incidences of the particular problem faced. Could be taken in medium and long term. Often, these corrective actions will result in changes to a project's scope, schedule, or cost. It is imperative that all of the findings and preventive actions are detailed and formally communicated with the project team so changes can go through the change management process and be implemented in the project plan upon approval.

Investigative Team and Method

This section of the Root Cause Analysis should describe how the investigative team is assembled, who it consists of, and how it gathers the data to be used in the analysis. As with any process, it is important in the RCA that clear roles and methodologies be established in order to allow for the process to move in a controlled and deliberate manner. This is also an important part of the RCA because a majority of time spent in RCA is gathering data about the event/problem.

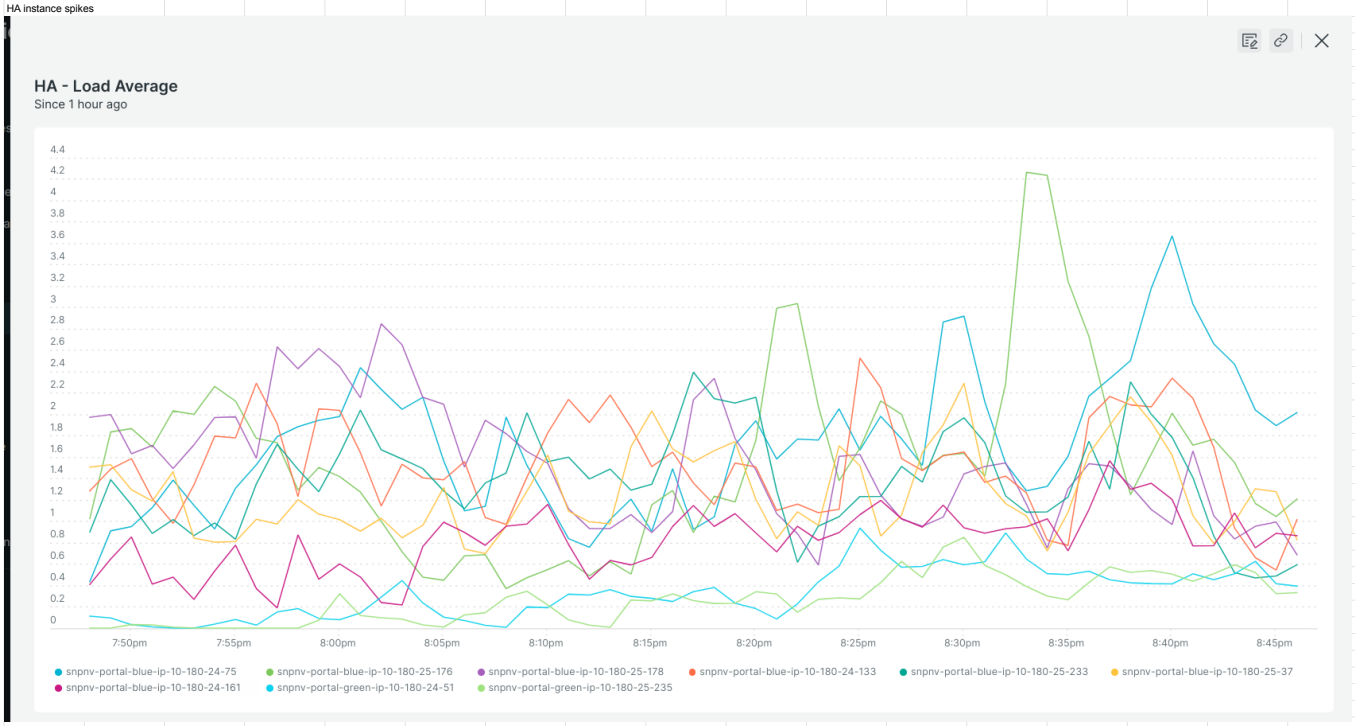
Chronology of Events/Timeline

In this section of the Root Cause Analysis you are to provide a detailed chronology of the events leading up to, and following, the problem. This is an important piece of the RCA as the chronology of events may lead to clues in determining how or why the problem occurred. Be sure to include names, times and detailed descriptions of all activities.

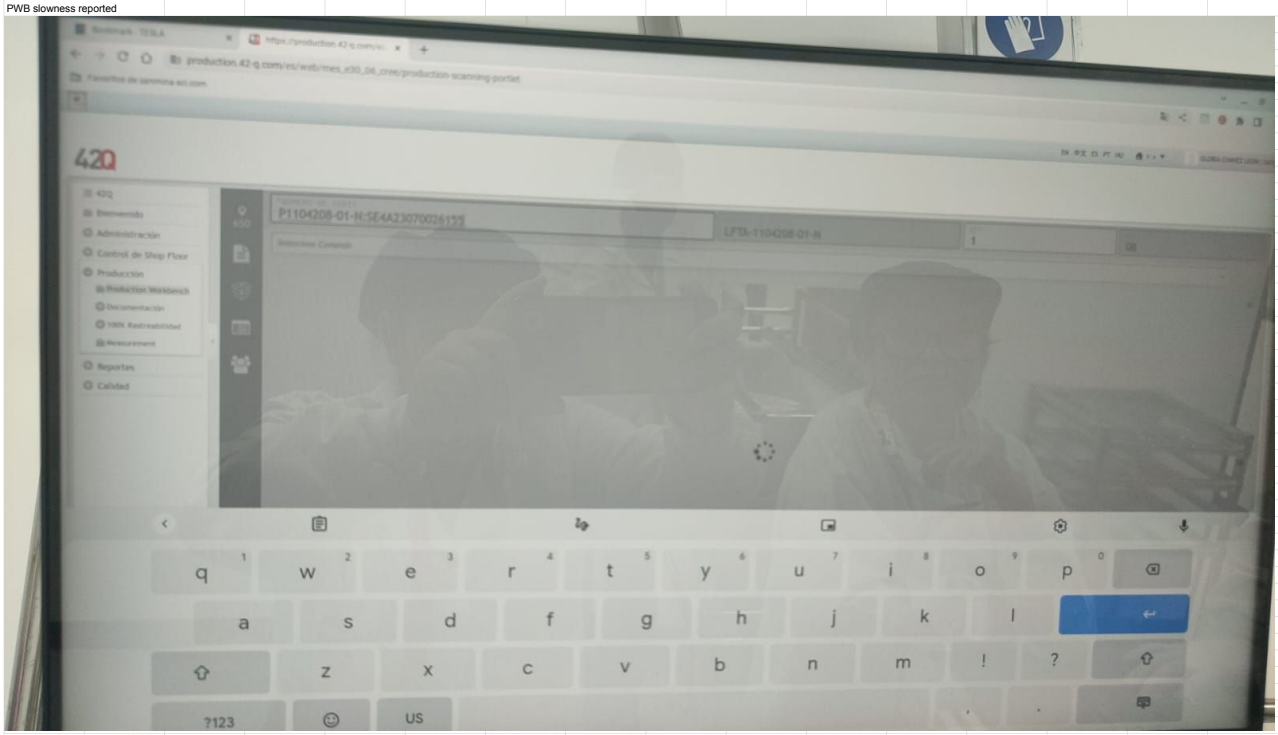
Findings

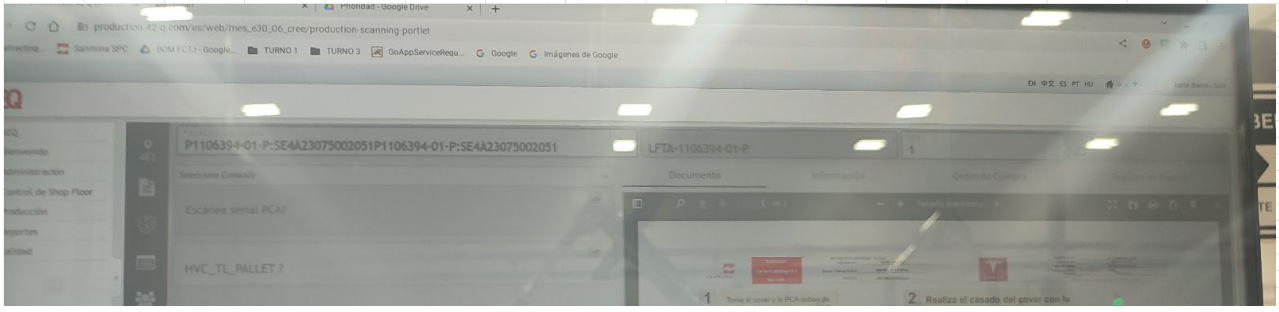
This part of the Root Cause Analysis should describe the findings of the investigation and explain the root cause(s) based on these findings. It is possible that a RCA results in findings that are not directly related to the root cause of the problem. These should also be captured as product/process improvement steps in an effort to improve the product/project. It is important to note that this section does not describe the corrective actions to be taken as a result of identifying root cause. Corrective action will be discussed separately in the next paragraph. All findings must be formally communicated with the project team in order to ensure any project changes can be made in accordance with the project's change management process.

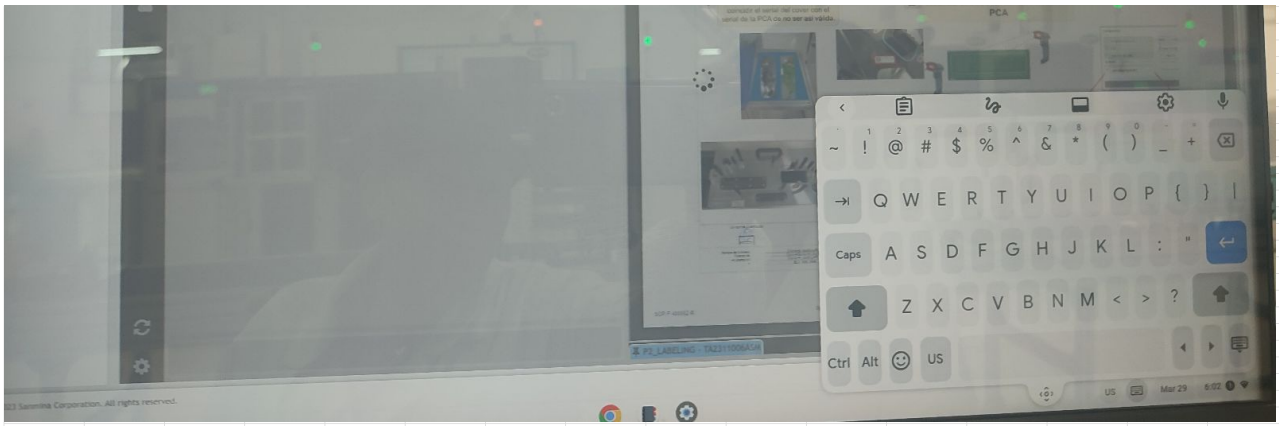
HA instance spikes



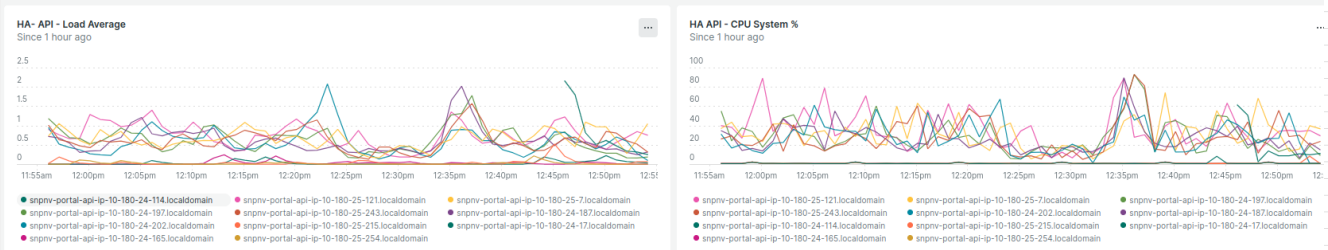
PWB slowness reported



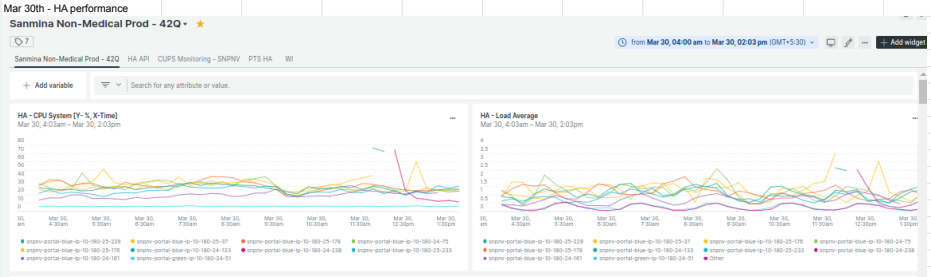




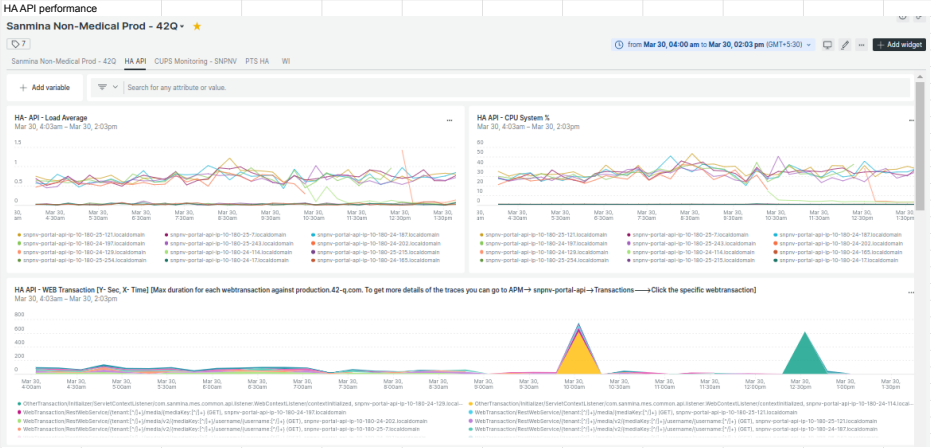
API performance



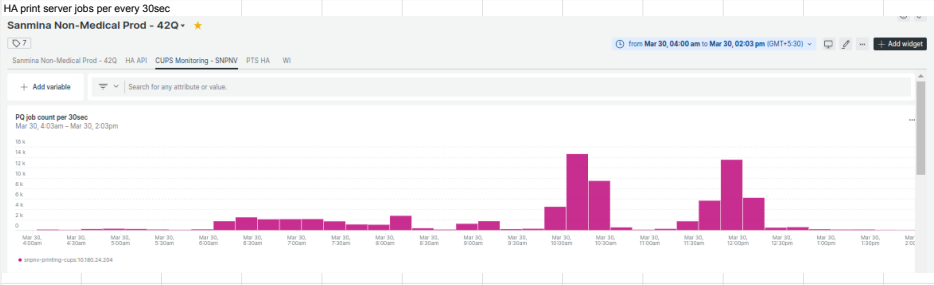
Mar 30th - HA performance



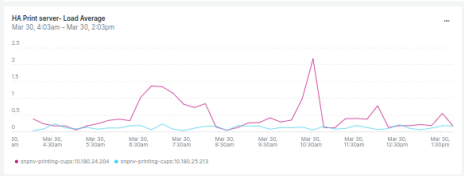
HA API performance

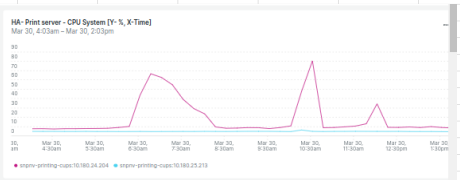


HA print server jobs per every 30sec



HA print server performance





Email alerts for the stuck PQ jobs

Problem	The.....
Conclusion	Issue happened.....

	1st Why	2nd Why	3rd Why	4th Why	5th Why	Actions per case:	Type of action
Possible reasons	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....		Select an option
		Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....		Select an option
		Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....		Select an option
	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....		Select an option
		Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....		Select an option
	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....	Q: Why.....? A: The.....		Select an option

Instructions:

1- The first question must be created based on what the symptom the final users are facing.
2- Each case could have possible causes, but we must focus on and go deeper investigating the things that made 42Q systems to have not correct behavior. Also consider that during the analysis some preventive actions could be found.
3- Highlight in GREEN corrective action and root cause identified for this incedent.
4- If any, highlight in YELLOW, preventive actions found. These could be root causes in the future.
5- Add as many possible reasons and WHYs if needed until root cause is identified.

Check below example as reference of a real case.

EXAMPLE

Problem	Multiple 42Q features not available
Conclusion	DNS server unavailable in Hunstville. This caused that MES servers in AWS could not be reached by the SFDC PCs. We know that the main problem was power outage in HSV datacenter. BUT **42Q ROOT CAUSE** was that SFDC PCS were not properly configured to use a DNS server in AWS as primary DNS instead of use a server in ground.

	1st Why	2nd Why	3rd Why	4th Why	5th Why	Actions per case:	Type of action
Possible reasons	Q: Why were multiple 42Q features not available? A: 42Q portal server was down.	Q: Why was 42Q portal server down? A: 42Q portal server was NOT down.	N/A	N/A	N/A	N/A	N/A
	Q: Why were multiple 42Q features not available? A: Amazon instances were not reachable.	Q: Why were AWS instances not reachable? A: There was a network issue in Hunstville data center.	Q: Why was a network issue in HSV datacenter? A: Power outage in HSV datacenter took down DNS servers.	Q: Why did DNS in HSV caused connectivity issues to AWS cloud instances? A: Some servers had Hunstville DNS servers listed as the primary and secondary DNS providers. Also some servers had the Huntsville Domain controller specified as the primary.	Q: Why was Huntsville listed as primary or Primary and Secondary in many servers? A: There are 2 fast DNS servers in Huntsville. Manual changes were made to improve DNS performance but not changed in an optimal way.	Correct DNS configuration in the servers, to have configured different primary and secondary DNS servers	Preventive Action
					Q: Why was Huntsville listed as primary or Primary and Secondary in many servers? A: It was not needed before for 42Q servers to use a DNS server hosted in AWS.	Configure as primary DNS the AWS DNS server in all AWS instances	Corrective Action (root cause)
		Q: Why were AWS instances not reachable? A: AWS tunnel was down.	Q: Why is AWS tunnel down? A: AWS tunnel was not down.	N/A	N/A	N/A	N/A

Technical Root Cause Analysis summary

RCA document name:	[Parent RCA name here & Link]	**DATE OF EVENT:**	Jan 12, 2019	**PENDING actions:**	0
RCA responsible person:	[Support's team member name]	**Type of downtime:**	Select	**WIP Actions:**	0
		Downtime (mins):		**COMPLETED actions:**	0

TAKEN ACTIONS BY TEAM		ADDITIONAL INFO				
		Status	Last update	Type of action	Should this be applied to more servers?	Comments
MES DBA						
Actions taken	1st action	Please select	Jan 1, 2001	Please select	Please select	
	2nd action.....	Please select		Please select	Please select	
	3rd action.....	Please select		Please select	Please select	
Select a team						
Actions taken	1st action	Please select		Please select	Please select	
	2nd action.....	Please select		Please select	Please select	
	3rd action.....	Please select		Please select	Please select	
Select a team						
Actions taken	1st action	Please select		Please select	Please select	
	2nd action.....	Please select		Please select	Please select	
	3rd action.....	Please select		Please select	Please select	
Select a team						
Actions taken	1st action	Please select		Please select	Please select	
	2nd action.....	Please select		Please select	Please select	
	3rd action.....	Please select		Please select	Please select	
Select a team						
Actions taken	1st action	Please select		Please select	Please select	
	2nd action.....	Please select		Please select	Please select	
	3rd action.....	Please select		Please select	Please select	
Select a team						
Actions taken	1st action	Please select		Please select	Please select	
	2nd action.....	Please select		Please select	Please select	
	3rd action.....	Please select		Please select	Please select	

In order to have in a quick look an idea about the RCA documents and where they are, please take a look at the below naming convetion.

RCA's Format name

RCA mm/dd/yyyy - Issue's description - Status suffix

Where:

RCA	Fixed element to identify the type of document.
mm/dd/yyyy -	Date of the first incidence of the event. US date format is MANDATORY.
Issue's description -	Brief description of the issue.
Status suffix	Current status of the issue and the team that needs to complete opened actions. See below suffixes definition.

Example: **RCA 05/30/2019 - Alfresco (fail to save) - WIP ENG**

Status Suffix convention

WIP SUP:	When RCA document is still being filled out by Support team.
WIP DEVOPS:	Issue is partially solved but DEVOPS team still needs to apply some changes in order to complete pending actions to solve the root cause.
WIP ENG:	Issue is temporarily mitigated and Engineering team still working in final fix.
WIP MED:	Issue is solved and containment actions applied but final solution deployment is not medically released yet.
COMP:	Issue is solved and there are no more actions opened assigned to any team.
TO DELPOY:	Issue is solved, fix tested in UAT and it is pending to be deployed in production.