FA Manager Tool Use for Failure Analysis

Document Number and Revision: PROC-10060 Rev 03

Overview

This document describes the following:

- Conditions for opening Failure Analysis (FA) Tickets for Sub-assembly, Server and Solution test failures using the FA Manager application
- Guidelines for entering data into FA tickets for test failures using FA Manager
- Conditions and guidelines for closing FA tickets for test failures using FA Manager

Audience

Oracle SCO Supplier Engineering, Oracle SCO Product Engineering, External Manufacturing Quality and Test Engineers and External Manufacturing Debug Technicians

1 Contents

2 Introduction

This procedure means to:

- Provide consistent criteria for opening FA tickets at external manufacturers after L11 rack unit failures
- Provide consistent criteria for opening FA tickets at external manufacturers after L10 or lower level sub-assembly failures
- Insure FA tickets are filled out appropriately and completely
- Provide consistent guidelines for closing out FA tickets

NOTE 1: Oracle supplier management may exempt specific requirements with director or VP approval under exigent circumstances.

3 Opening FA tickets for test failures

2.1 Basic Policies for FA Manager

1. A FA ticket must be opened in the FA Manager application for every testable unit that experiences a test stop during a production test logop such as BBT (Building Block Test), SFT (System Functional Test) or SOLT (Solution Test). These are example logops and do not represent all of the production test logops. An exception to this policy exists for “debug” or replication runs of Solution logops. See item 7.
2. A test stop from a spawned test process such as SOLT_CHILD does not require an FA ticket.
3. Test stops include both test failures and test aborts, whether manually or automatically generated.
4. Testable units include all assemblies directly tested by a functional test profile. Some examples: Boards with an ATS Functional test profile (e.g. BFT), L4/L6/L10 assemblies, Servers, Power Distribution Units (PDUs) and Switches. See exception below for system modules within a chassis at SOLT.
5. Tickets are required for test stops that occur during a FAST test software qualification and/or a hardware qualification. (Isproductionrun=’N’)
6. Tickets are required during NPI (BuildID not in ‘RR’, Isproductionrun=’N’) test stops if the Oracle PE who owns the product specifies they are needed via a PA or other written instruction.
7. FA tickets are **not** typically required for test stops incurred during debug operations like the duplication of a production mode failure. Examples of debug operations are a SOLT re-run for duplication, or an SFT_FA run for verification of a fix. The only exception to this rule is the rare case where a failure mode detected during debug is completely unrelated to the original failure mode.

8. If a server system includes more than one System Module (e.g. module with separate CPU) which spawns a child test process at SOLT or other Solution Tests, only one FA ticket is required for that entire server system at the Solution Test. The server system is identified in the FA ticket by the chassis serial number, not any system module serial number.
9. If multiple units in a rack Solution are impacted by the same root cause for the test failure, such as a test process problem, failure of another unit in the rack, or a power outage, the "Victim Ticket Template" tab can be used. See section 2.2. Note that all "Victim Template" tickets will **not** necessarily have a root-cause classification of "VICTIMUNIT".
10. Always check to see whether a ticket has already been opened for a particular Logop, Teststarttime and Unit to avoid duplication of tickets. The FA2 manager interface will notify you if you are attempting to add a ticket to exactly the same unit and test stop as a previously opened ticket.

4 Additional Rack Solution Policies for FA Manager

When creating FA tickets for a Solution failure batch, the user has these options within the "Create for a Solution" process flow:

- Creating a Parent (Solution level) ticket along with associated Victim Unit tickets (no at-fault testable unit)
- Creating a Parent ticket along with an At-Fault-Unit ticket. The At-Fault ticket is associated with the Parent ticket
- Creating a Parent Ticket, an associated At-Fault-Unit ticket, and a group of associated Victim Unit tickets

One would create only a parent ticket and Victim tickets (for all test stops within the Solution Failure) if the failures are not due to any testable unit or solution-level component within the rack. A Test Process or Test Infrastructure failure may call for creating only a Parent and Victim Tickets. There is a checkbox in the FA2 Manager tool root-cause tab for this option.

When the only test run within a Solution which fails or is aborted is the At-Fault Unit, then the Parent ticket along with an At-Fault Unit ticket is created.

If there is more than one At-Fault Unit or At-Fault component type in a single solution batch, separate Parent and At-Fault Unit ticket pairings need to be created in FA2. A second at-fault ticket is needed for separate root cause categorization. In this case, the "Create for a Solution" sequence needs to be re-started and the same batch needs to be re-selected.

When a group of units fail as collateral damage from an At-Fault Unit failure, a Parent Ticket, an At-Fault ticket and Victim Tickets should be created for the group of test stops. The Victim Tickets are created as a group by using the Victim Ticket Template.

The Category Code or Typecode of 'VICTIMUNIT' is used in the Victim Ticket Template when a testable unit fails as a direct result of another testable unit's failure. A good example is for units that need to be aborted and re-started due to another unit's failure. The 'VICTIMUNIT' categorization is **not** used when a unit fails due to problems such as a test profile issue, product bug, test infrastructure, assembly or solution-level component failure (such as a cable failure).

Once the user creates tickets using the new solution process flow, the user can edit them in a similar fashion to tickets created individually using the "Create with test result" process flow.

NOTE 2: Tickets for rack solution fails implicating testable units (for example servers) where the testable unit itself will need further debug, should NOT BE CLOSED UNTIL DEBUG IS COMPLETE. A ticket created for the L11 logop (e.g. SOLT, LMT, RST etc.) should remain open until the final root-cause categorization is determined. See sections 9 and 10.

5 Service Level Agreements for L10 and L11 Debug

Service level turn-around time agreements are negotiated with individual external manufacturers. A typical maximum debug turn-around time is 24 hours from Open to Close for a Server-level (e.g. SFT) failure ticket or 72 hours from Open to Close or Open to L10 Debug for a Solution-level (e.g. SOLT) ticket.

6 Opening FA tickets for failures seen outside of test operations

There are some electrical test operations such as Hi-Pot, some versions of Post-Pack-Audit (PPA) and manual PDU tests, that need a ticket logged even though they are not automated. If a failure occurs during one of these non-automated tests, it will need to be logged without a failing test-set attached. The FA team can log a failure without a test-set attached by selecting the option to create an FA ticket "without a test result".

7 Adding content to FA tickets for test failures

Every FA ticket should move through at least 3 Stages. At minimum, the stages should include:

- OPEN
- ANALYSIS (Note: reproduce failure during analysis stage)
- CLOSE

Every FA Ticket includes at least one Action. Actions are added to ANALYSIS and/or REPAIR states. Actions should not be added to transitory states like OPEN, ON_HOLD, L10_DEBUG or CLOSE. Actions include relocating a system or part, re-running the same test, re-queueing the system for re-testing, moving, reseating, replacing, repairing, adding or subtracting a component etc.

6.1 Actions created during the ANALYSIS state

Actions taken to duplicate a failure in order to see if it is replicable should be added during the ANALYSIS state. They should be added with an "Analysis" action category. Other actions, which are not a corrective action, can also be added under the "Analysis" category. Typical "Analysis" state actions are "duplicate failure" or "re-queue for test".

6.2 Actions created during the REPAIR state for L11 failures

Physically changing a system, solution, or any component within a system or Solution is documented in the REPAIR State. Use a barcode scanner, not manual typing, to add part number and serial number information to the FA Manager interface when the Part Number and Serial Number of the component or Unit is not available from a BOM pick-list.

- Actions are required for Solution At-Fault tickets. To add actions, the user edits the "At-Fault" ticket after its creation.
- FA2 allows the user to access a partial Solution BOM in the step where one chooses an at-fault test result (2nd tab). However, using the Solution BOM as a component pick-list for solution-level components prevents the At-Fault or Solution ticket from being associated with a unit GUTI. This prevents live linkage of the ticket to a test log file.
- To associate a solution component failure directly with a test log file, the user should choose a testable unit result, with an appropriate symptom, for the failure mode in the "At-Fault Result" tab. The solution component PN and SN can be added to the At-Fault ticket after creation instead of the testable unit PN and SN.

NOTE: Do not use a "Generic" or 'General' action for any physical interaction with systems or components.

Replacements:

- Any replacement of a testable unit or a removable buy-level component must be documented with a "Corrective Action" action category and the Action type "Part Replacement".

- The Part Number and Serial Number of the replaced unit or component is documented in the At-Fault ticket using an Action. Testable unit PNs and SNs are available in the Test BOM pick-list. Indirectly tested components like cables can be entered using the non-BOM part tab.
- It is preferred, but not required, that the Part Number and Serial Number of the replacement unit or part be also entered in FA Manager.
- Even if a serial number is not available, a failing part number should be entered in the ticket using an Action.

Swaps:

- Any re-location (swap location) of a testable unit or a removable buy-level component within a solution must be documented, using an Action, in the At-Fault ticket. The component PN and SN information is obtained by scanning-in, cutting/pasting, or picking the Part Number/Serial Number of the relocated unit or part, as well as the Part Number and Serial Number of the unit or component, which it was swapped with. The action type used should be "Swap Component location" or "Swap".
- Even if a serial number is not available, a failing part number should be entered in the ticket using an Action.

Reseats/Repairs:

- Any re-seat or repair of a removable buy-level component (such as a cable) within a solution must be documented in the At-Fault ticket by entering the Part Number and Serial Number of the component. The action type used should be "Re-seat" or "Repair".
- Even if a serial number is not available, a failing part number should be entered in the ticket using an Action.

Note: The need to "reset" (rather than re-seat) a testable unit using a firmware reset or hardware push-button often implies a product design or test software issue rather than faulty hardware. There is presently no "reset" Action type. Use appropriate free-form comments, along with a "Repair" action, to document firmware or button resets.

6.3 Actions created during the REPAIR state for L10 failures

Any physical action, which involves moving, or changing a system or any component within a system, should be documented under the REPAIR State. Use a barcode scanner, not manual typing, to add part number and serial number information to the FA Manager interface if the Part Number and Serial Number of the component or Unit is not available from the BOM pick-list within the FA Manager GUI. Even if a serial number is not available, a failing part number should be entered in the ticket using an Action.

8 Adding content to the Victim ticket template at the L11 level

Sometimes it is determined that a unit failure or abort was due to

a) A different unit within the rack which was the true at-fault unit
b) A Test Process problem
c) An environmental or infrastructure problem such as a power outage
d) A solution level component (such as a cable)

This type of unit test stop must still have an FA ticket opened for it. The latest version of the FA Manager user interface (FA2) enables the creation of multiple tickets at once using a Victim Ticket template. These types of tickets can have a shortened life cycle including just the OPEN, ANALYSIS and CLOSE stages. Victim tickets associated with another testable At-Fault Unit rather than a generic test process problem, infrastructure issue, or solution-level component use these categories:

- Category Code = Victim Unit
- Type Code = Victim Unit

In these cases, the Conclusion Details required for a victim unit failure will refer to the Unit serial number and FAID of the unit actually at fault. *Units aborted in order to replace a faulty testable unit use this categoriza*tion.

If no testable unit was actually at fault (Test Process or Infrastructure problem) then the Victim Unit ticket template should document the non-hardware failure categories (e.g. TESTPROCESS -> TESTPROFILE etc.).

If an indirectly tested solution hardware component, such as a cable, is at fault, the template should use the appropriate assembly process or component category (e.g. ASSYPROCESS -> CABLE-> SEATING or COMPONENT->CABLE->FUNCTIONAL->OTHER).

Remind the FA technicians at the EM sites not to over-use the VICTIMUNIT categorization. The VICTIMUNIT root cause category does not cover Test Profile bugs, Product Design bugs, Assembly Process problems or problems with indirectly tested solution-level components such as L11 cables.

9 Non-replicable failures

Failures, which cannot be replicated, still require an FA ticket for the test stop. Tickets for non-replicable failures can use only the OPEN, ANALYSIS and CLOSE stages. The FA Conclusion should refer to the symptom that was non-replicable.

If a non-replicable failure is due to a Test Profile bug, Design bug, PA (experiment) or NCAT that issue ID is referenced in the ticket's Conclusion details. Failures known to be due to a Test Profile bug, Design bug, PA (experiment) or NCAT should have appropriate categorization (**not** NTF). The NTF category is for failures not attributed to Test Process, Assembly Process or Product Design categories. Any failure attributable to a known bug, NCAT or Test Engineering Change Request is no categorized NTF.

Record relevant actions in the FA ticket using the Action tab, even if the results were NTF, for example: Retest System

10 Server Hardware Failures at the L11 level

Tickets for a server hardware failure at the L11 level are not closed after the server replacement Action. The sequence taken should be:

1. When using the FA2 application, a server hardware failure will be an "At Fault Unit" ticket. The At-Fault-Unit ticket is created in the "Open" state.
2. Document the server replacement by adding an Action to the REPAIR stage of type "Part Replacement" within the "At Fault" ticket.
3. Add the part number and serial number of the replaced unit to the FA Manager user interface using the FA2 Manager BOM pick-list.
4. Move the ticket to the summary tab. Use 'COMPONENT' as Category Code and 'SERVER' as Type Code failure categories. The L10 debug team will change categories when the component within the server is determined.
5. Do Not Close the ticket. Move the ticket to the L10 Debug Queue state.
6. The L11 FA team will add comments along with state changes and actions to help the L10 team debug the system when they receive it. They may then move the ticket to the "L10 Debug Queue" (L10DEBUG) state.
7. The at-fault server ticket will remain open until closed after final repair by the L10 failure analysis team. The L10 failure analysis team may add additional Repair Actions. Additional Repair actions will include any physical changes to the system or within the system such as component re-seats, swaps or replacements. The L10 failure analysis team may change the FA Manager Root Cause Categories if they determine that the original failure categories are incorrect.

11 Debug for L10/L6/L4 fails from L11 or Server-Level testing

1. In the FA2 user interface, an at-fault unit ticket originating from a solution failure starts in the OPEN or ANALYSIS state. The user moves it to the L10DEBUG state to indicate that it is waiting for L10 level debug.
2. It is highly recommended that the L10 FA team duplicate the failure with the same or similar failure symptoms in a subsequent Analysis state before moving to a new Repair state. See section 12 for exceptions to this requirement. This is the same practice used for failure tickets created from failures during server-level (e.g. SFT) or sub-assembly (e.g. BBT) level testing.
3. The L10 failure analysis team will change preliminary summary tab categorizations entered by the L11 debug team if they are incorrect.
4. If a board or component is repaired and then re-used in the original system it was taken out of, the action type should be "Repair". The repaired component PN and SN is recorded in the Action. ***Do not confuse this "Repair" Action with the "Repair" State***.
5. The protocol for component Actions in the L11 Actions section is applicable to L10 or Sub-assembly failures. Component reseats, swaps, replacements, additions, removal or repairs are documented with an Action. Component PNs and SNs are recorded within the Action. If component PNs and SNs are not available from the FA Manager BOM component pick-list, they must be recorded using non-BOM component action options.
6. Re-test without repair (e.g. for a test process failure) should also be documented in the Actions tab.

12 Component Type-codes

L11, L10, L6, L4 etc. assembly level failures with the main category code of 'COMPONENT (hardware) failures are further categorized using Type-codes. Type-codes under the main 'COMPOENT' category indicate the type of component undergoing Replace, Reseat, Swap Location or Repair Actions. Categorizing a ticket with a Type-code does not remove the requirement to add the Part Number and Serial Number of the affected component to the ticket within the Actions tab. The BOM Description Field of a component will frequently indicate the Type-Code for the failure. Assembly process (ASSYPROCESS Category) failures are also categorized with Type-Codes.

13 Non-Replicable hardware failures with special instructions

Occasionally, Oracle instructs the FA team to replace parts, within servers, which failed at the L10 or L11 level even though failure symptoms cannot be duplicated at the L10 level.

L11 or L10 failures from another site, which do not replicate locally during debug, should only result in component replacement actions **with Oracle approval**. In such cases, a new ticket is created without a test-result attached. That ticket should record the replaced and replacement parts in an Action tab. Oracle instructions to replace parts without duplication of symptoms are documented in the Conclusion text.

If L11 failures from a separate manufacturing site duplicate in test at the L10 level, the ticket is associated with the failing L10 logop such as FACOPs or REPAIR.

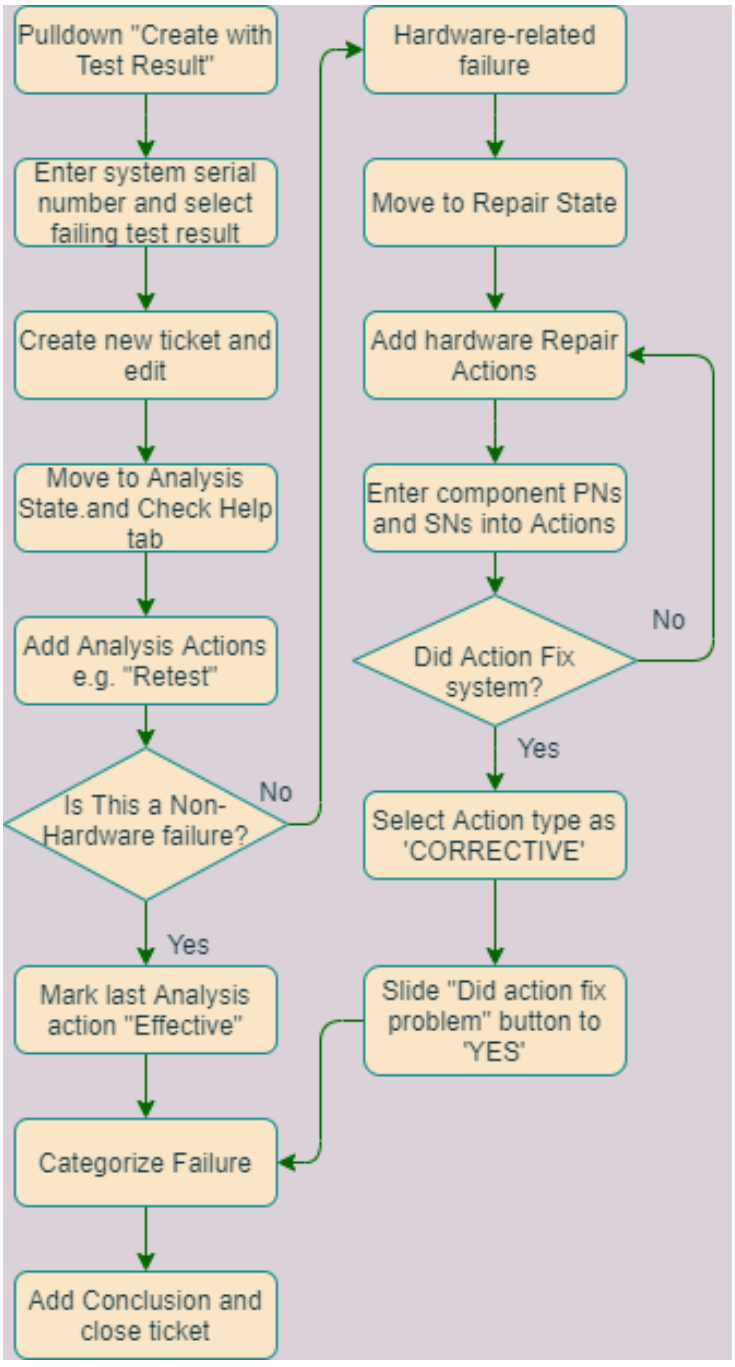
14 Closing FA tickets

Do not close FA tickets until final root-cause categories are determined and conclusion details are documented. L10 or sub-assembly tickets which include physical repair actions should always be run through a VERIFY stage to insure the repair is successful. Actions to verify the repair should be documented within that stage and in the ticket conclusion details.

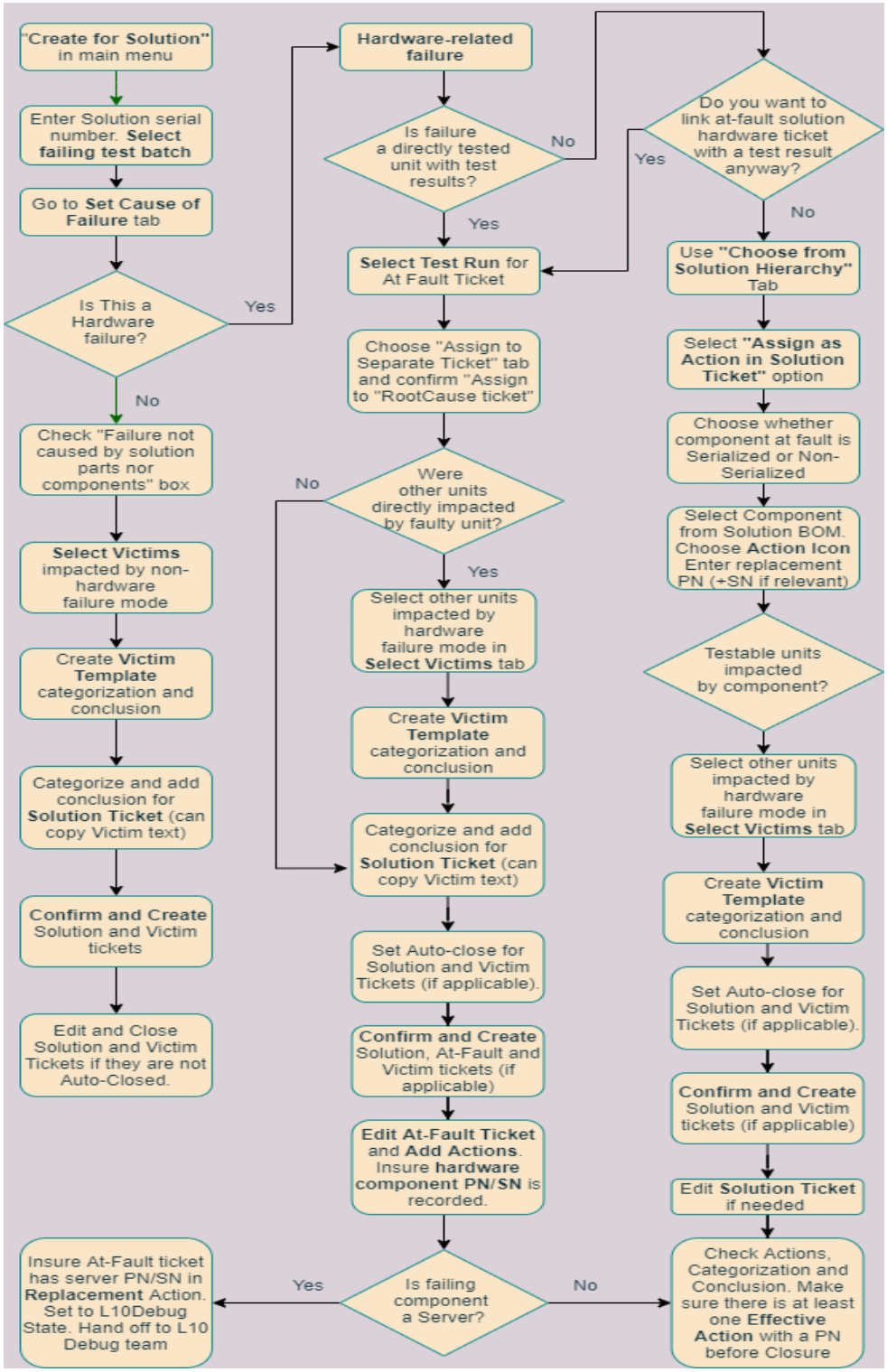
Every open ticket is moved to a CLOSED state with appropriate commentary and root cause categorizations. It is possible to change root cause categories/diagnosis prior to closure of a ticket if the originally entered root cause categories are incorrect. In rare circumstances, tickets are opened accidentally and can be aborted. Tickets cannot be deleted once opened.

It is possible to edit a closed ticket to correct root cause categorizations. However, a closed ticket should not be re-opened for new physical actions. If hardware put back into production test after an unsuccessful repair effort fails again, one opens a new ticket.

15 Process Flow for Server, Subassembly or Board Failure FA Ticket with test result



16 Process Flow for Rack Solution FA Ticket Batch Creation



Reference Documents and Records

Document Title	Number	ESO Controlled		Quality Record	
		Yes	No	Yes	No

Document History and Approval

Dash	Rev	Date	Description of Change	Originator
A	02	02 Feb 2021	Initial release.	N/A
History				
Rev		**Date**	**Description of Change**	**Originator**
03		24 Jan 2022	Updated confidentiality statement to Oracle Restricted. Updated ESO contact alias from Beehive to eso_business_docs_us_grp@oracle.com. No content change.	N/A

17 Related Information

REASON FOR CHANGE:
Initial Release of Document

- When Document Template is complete, email source file to eso_business_docs_us_grp@oracle.com
- All hard copies of this document are uncontrolled and are to be used for reference only.
- For questions or comments about this document, please send an email to: *eso_business_docs_us_grp@oracle.com*