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OpenVMS
Bootcamp 2010

Principles of Troubleshooting and Problem Solving with OpenVMS

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First, accurately describe the problem.

Identify and document:

- 1) What was done? (the sequence of events and actions)
- 2) What results were expected, based on what happened?
- 3) What unexpected results were instead observed?

Record the evidence of the anomaly.

Record, in a format which can be shared with HP Support (and eventually OpenVMS Engineering if need be):

- The exact steps taken
- The exact output seen

Is observed behavior incorrect, or merely unexpected?

- Sometimes a result may be unexpected or unintuitive, but still meet the design and operational goals of the product.
- Check the documentation, Software Product Description, and source listings if available

Record the details of the environment.

- The environment in which the anomaly occurs, and
 - Any environment (or variation of the environment) in which the anomaly does ***not*** occur
- Goal here is to identify what is required to reproduce the problem

Attempt to reproduce the problem.

Try to cause the same problem, repeatedly
(or at least in some fraction of the attempts):

- Repeat the same steps or variations of steps, trying to find a set of steps which can reliably reproduce the problem
- Watch for anomalous or unexpected results during this testing

Try to narrow down when the problem occurs.

- Identify more specifically the minimum environment needed to reproduce the problem

Enumerate all conceivable causes for the anomaly.

- This typically requires either knowledge of the internal operation of the product or technology, or working cooperatively with HP Support or OpenVMS Engineering resources with that Internals-level knowledge

Try to rule out some of the potential causes.

- Try functionally-equivalent substitutes for pieces of the environment that are suspect

Try to identify the most-probable causes.

Test for the most-likely causes first.

It can be helpful to be familiar with:

- What types of failures most commonly occur:
 - Hardware example: Moving parts (fans, spinning disks)
 - Software example: Off-by-one errors; infrequently-used code paths
- When in the life cycle of a product the failures typically occur:
 - Hardware example: Infant Mortality, End of Life
 - Software example: V1.0 release, new features, recent bug fixes

Further narrow down the problem environment.

Based on the experience gained during testing:

- Keep only those characteristics of the environment that are actually required to duplicate the problem, while eliminating extraneous factors

Think of ways to make the problem more visible.

- Turn on logging where available
- Develop tools (or use tools HP provides) to:
 - 1) Examine the state of the product in more detail
 - 2) Automate the data analysis process
 - 3) More-quickly identify anomalies when they occur

Follow an organized test process.

Change only one thing at a time.

- This allows you to conclusively identify exactly what factor is involved in any difference between two consecutive tests, and to return to the previous state if a given test gives unsatisfactory results

Document all changes made and the results of all tests.

Create simple scripts to reproduce the problem.

- Simplify the test scripts/procedures/methods to the minimum necessary to reproduce the problem
- Eliminate all the site-specific factors that you possibly can (custom applications, unique hardware or configurations , etc.)
- Provide these test scripts/procedures/methods to HP Support or OpenVMS Engineering

Work with HP as a partner.

- Report anomalies whenever found
 - Solving problems contributes to the quality of OpenVMS and other HP products for all of us
- Get HP involved early
- Cooperate to the degree possible with troubleshooting suggestions from HP Support or OpenVMS Engineering
- Brainstorm together with HP during the troubleshooting process. Your suggestions and insights are invaluable.

Questions?

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