

Integration testing

Integration testing (sometimes called **integration and testing**, abbreviated **I&T**) is the phase in software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before validation testing. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates, and delivers as its output the integrated system ready for system testing.^[1]

Approach

Some different types of integration testing are big-bang, mixed (sandwich), risky-hardest, top-down, and bottom-up. Other Integration Patterns^[2] are: collaboration integration, backbone integration, layer integration, client-server integration, distributed services integration and high-frequency integration.

In the big-bang approach, most of the developed modules are coupled together to form a complete software system or major part of the system and then used for integration testing. This method is very effective for saving time in the integration testing process. However, if the test cases and their results are not recorded properly, the entire integration process will be more complicated and may prevent the testing team from achieving the goal of integration testing.

Bottom-up testing is an approach to integrated testing where the lowest level components are tested first, then used to facilitate the testing of higher level components. The process is repeated until the component at the top of the hierarchy is tested. All the bottom or low-level modules, procedures or functions are integrated and then tested. After the integration testing of lower level integrated modules, the next level of modules will be formed and can be used for integration testing. This approach is helpful only when all or most of the modules of the same development level are ready. This method also helps to determine the levels of software developed and makes it easier to report testing progress in the form of a percentage.

Top-down testing is an approach to integrated testing where the top integrated modules are tested and the branch of the module is tested step by step until the end of the related module.

Sandwich testing is an approach to combine top down testing with bottom up testing.

One limitation to this sort of testing is that any conditions not stated in specified integration tests, outside of the confirmation of the execution of design items, will generally not be tested.

References

1. Martyn A Ould & Charles Unwin (ed), *Testing in Software Development*, BCS (1986), p71 (<https://books.google.com/books?id=utFCImZOTEIC&pg=PA73&dq=integration+test&hl=en&sa=X&ei=4EpTVOVJMayu7Aak5YCIDA&ved=0CDwQ6AEwAg#v=onepage&q=integration%20test&f=false>). Accessed 31 Oct 2014

2. Binder, Robert V.: *Testing Object-Oriented Systems: Models, Patterns, and Tools*. Addison Wesley 1999. ISBN 0-201-80938-9

See also

- Design predicates
 - Functional testing
 - Continuous integration
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This page was last edited on 21 October 2018, at 19:08 (UTC).

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