

This document is accessible online, on the web, at:
<http://drpartha.org.in/publications/ivnv5.pdf>

IV&V SERVICES FROM ALGOLOGIC

ivnv5.odt
2016-05-15

About this document

This document gives an overview of “*Comprehensive IV&V*”, a concept promoted by Algologic Reserarch & Solutions. This document is NOT to be treated as a proposal or a contractual document of any kind. This is a draft version of a purely academic and speculative document. Readers are invited to send their comments, queries, remarks, and suggestions, to info.algolog@gmail.com

Please read the disclaimers section at the end of this document.

For any clarifications on this subject, contact :
[info.algolog @ gmail.com](mailto:info.algolog@gmail.com) .

Comprehensive IV&V Services

Do you develop software for serious, mission-critical applications ? Do you want an independent agency to ensure that you are building your software the right way ? Do you want to confirm if you are building the right software ? Do you want to assess, to what extent you are complying with standards ?

The IEEE Standard ANSI / IEEE Std. 729-1983 defines verification and validation as:

validation:

- the process of evaluating the software at the end of the software development process to ensure compliance with software requirements

verification:

- the process of determining whether or not the products of a given phase of the software development cycle fulfil the requirements established during the previous phase
- formal proof of program correctness

The seminal book titled “*Software validation, verification, testing and documentation*” by Stephen J Andriole (Pub. Petrocelli Books, NJ. USA) explicits that:

- **validation** determines the correctness of the end product

- **verification** is performed at each phase and between each phase of the development life cycle

In addition to the “correctness” of the product and processes, compliance to appropriate standards is an indispensable part of software development for mission-critical applications. Mission-critical software may be expected to comply with domain-specific standards (e.g. CENELEC), or domain-independent standards (e.g. IEC 61508), or process standards (e.g. SEI/CMM, ISO900x). In all cases, a rigorous approach is needed for assessing the level of standards compliance. So, we add “standards compliance” to the above:

- **standards compliance** is the act of identifying appropriate standards for a given software and verifying the adherence of the software to the standards.

Algologic has therefore included this important dimension to V & V -- that of conformance to standards -- and has launched its Comprehensive IV&V Services Division which can be a one-stop source for a wide range of services related to verification, validation and standards compliance.

- **Comprehensive IV&V Services** may be defined as an integrated approach to verification, validation and standards compliance.

Algologic proposes a holistic and integrated approach, to software conformance. The approach relies heavily on sound mathematical principles which also take into account human attitudes and cultural background of the developers and end-users.

The literature on V & V strongly recommends that V & V should be always done by an agency which is managerially and financially independent of the software design and development team. Algologic is committed to maintaining this autonomy and can therefore be an ideal organisation to whom you can trust your V & V activities. Algologic is also committed to maintaining the strictest confidentiality about the products and information entrusted to it. You can therefore be assured of obtaining the best opinion from a competent team.

In this document, IV&V should be understood as services which involve assistance in the following areas :

- development of formal specifications
- review of existing specifications
- vulnerability and hazards analysis
- design reviews
- verification services
- product validation

- program flow analysis
- documentation audit
- usability analysis
- design of test plans
- coding guidelines and style reviews
- test coverage analysis
- selection and evaluation of applicable standards
- configuration management
- standards conformance assessment
- training
- Consultancy, and contracted research

You can opt for any combination of the above services. Algologic can undertake the above on a turn-key basis, or on a Client-assisted basis. The above activities may be done at your site or at Algologic premises. For a specific proposal, tuned to your requirements, just contact Algologic.

Disclaimers :

Algologic believes in total honesty and transparency. Please read the following points very carefully, and ensure that you understand and accept their implications:

1. This document should not be understood as a proposal for services or as a contractually binding offer of any kind. This is a draft version of a purely academic and speculative document.
2. Algologic has no formal authorisation, certification, or accreditation by any government agency or legal agency, to perform such IV&V. Its IV&V report may not have any legal sanctity.
3. In this document, IV&V should be understood as a service consisting of an integrated approach to : verification, validation and standards conformance (termed by Algologic, as Comprehensive IV&V i.e. C I V & V)..
4. An IV&V report by Algologic does not amount to any confirmation of the product being defect-free. This is because formal IV&V is itself still a matter of research and discovery. Moreover, by its very nature, mission-critical software is a complex entity. The tools and technologies used are still subject to debate and controversies.
5. The dependability of an IV&V investigation is subject to several imponderables. IV&V of software will depend on the form in which the specifications and design are available. To be able to perform a formal IV&V, the specifications and the design should be in a formally verifiable form. English language specifications or design will first have

to be converted into a formally verifiable framework. This translation itself could be erroneous or defective.

6. The conclusions of an IV&V depend largely on the honesty, cooperation and transparency of the developing agency whose product is being verified.
7. IV&V is a time consuming activity. Please do NOT impose unreasonable time schedules to complete an IV&V.
8. IV&V from Algologic is a purely diagnostic service. It does not suggest any remedial or corrective measures. This is in line with IEEE Standard 729-1983 which specifies that IV&V should be done by “*an organization which is both technically and managerially separate from the organization responsible for developing the project*”.
9. Since IV&V should be completely isolated from the development activities, IV&V at Algologic, does not include prescription or suggestion of any remedial measures. The IV&V auditor should not be involved in suggesting or taking up mitigating procedures or remedial measures. Only the developing agency must take all necessary steps, to repair or mitigate the flaws discovered by the IV&V process. In this sense, Algologic's IV&V is similar to a diagnostics or pathology laboratory. It does NOT claim to be a clinic where therapeutic services are rendered.
10. Although there are industry-specific or domain-specific standards on how a mission-critical software should be developed, there is still no consensus or standard as to how the conformance to standards should itself be verified. In case any such standard exists for performing IV&V, the client is free to suggest the standard for performing IV&V.
11. Algologic does not accept any responsibility or liability for the consequences of using a software on which IV&V has been done by Algologic.
12. Please discuss all the above points clearly with Algologic, before making any serious decisions. Algologic can be contacted by e-mail, at the address : **info.algolog@gmail.com**

****ivnv5.odt