

Overview

This standard covers the competences required to design, plan, perform and communicate results for the testing of IIoT systems. This includes the development of simulations and test methodologies for the testing of end-to-end IIoT solutions.

IIoT system testing involves planning and carrying out testing for coverage of system requirements as well as to identify quality issues such as bugs and other errors. This includes performing tests across the different layers of the IIoT solution and conducting functional tests such as unit, system and acceptance tests and non-functional tests such as load, scalability and chaos tests for the IIoT solution. This also requires identifying any quality / test issues that arise, performing root-cause analysis and implementing corrective and / or preventative measures.

Following system testing and verification, the IIoT system will undergo acceptance testing to confirm sign off by relevant internal or external customers.

This standard is for those who design and carry out IIoT testing.

Performance criteria

You must be able to:

1. review IIoT system requirements to develop the test coverage strategy
2. create test plans to cover all functional and non-functional IIoT system requirements
3. develop test cases and simulations to verify requirements are met and to discover any defects in the IIoT system operation
4. identify test cases that can be automated to improve testing efficiency
5. create relevant test scenarios and develop test data relevant to the IIoT system requirements
6. validate the test plan, test coverage and test cases with appropriate stakeholders
7. execute test cases and simulations, evaluating the outcomes to inform system test reporting
8. test IIoT device discovery, interfaces, interoperability, performance and device communications across IIoT environments
9. perform functional, non-functional, load and user experience testing of IIoT systems to verify that the IIoT solution operates in compliance with organisational requirements
10. test individual software functions of the IIoT solution as per specifications
11. create and perform usability tests where the system interfaces with users through interface screens, addressing usability issues and collating feedback results
12. develop IIoT test automation infrastructure in line with test requirements
13. automate the test cases for user application interfaces and devices relevant to the requirements
14. test security and privacy compliance of the IIoT system in line with organisational security standards
15. identify and log bugs and other issues in defect tracking systems, following organisational procedures
16. undertake problem investigation to establish the root cause of problems found during testing and recommend solutions
17. create test documentation that describes the tests undertaken and results obtained, in line with organisational standards
18. communicate the outcomes of the tests or simulations with stakeholders
19. recommend modifications to the design of installed IIoT solutions based on any test failure results
20. carry out acceptance testing with customers to obtain IIoT system sign off from required stakeholders

Knowledge and understanding

You need to know and understand:

1. the organisational policies, procedures and guidelines which relate to testing the components of the IIoT solution 2. the organisational policies and procedures for data sharing and governance 3. the organisational policies and procedures for documenting IIoT test results 4. the organisational and legislative security and privacy standards and regulations that relate to IIoT solutions and their operation 5. the security controls, technologies and methods that mitigate security risks to IIoT solutions 6. the principles of designing tests for IIoT systems 7. how to perform necessary tests and measurements to bring IIoT system into live production environment 8. how to create suitable test cases and test data for IIoT applications 9. who to involve while performing IIoT testing 10. the range of standard templates and tools available for IIoT testing and how to use them 11. the different sources of information available for designing IIoT tests and how to access these 12. the main characteristics of IIoT test methods, including unit, sub-system, system, load, integration, automated, functional, non-functional, usability and acceptance testing 13. how to undertake acceptance testing to ensure the IIoT solution follows the specified customer requirements 14. the issues that may occur with testing IIoT requirements and how to address these 15. the industry standard simulation tools for prototyping IIoT systems and how to use them 16. how to evaluate defects and make recommendations on how to resolve them 17. the different industry standard test automation tools and how to use them 18. how to check whether test cases are suitable to be automated 19. how to access, create and modify test scenarios, test cases, automated test scripts, test data and test plans 20. different simulation methodologies and procedures used to check the tests are working and are fit for purpose 21. how to analyse and use feedback to improve your simulations 22. scripting / programming of languages to understand test cases 23. the current industry standard practice in the design of tests for integrated IIoT software and hardware systems 24. how to identify and refer anomalies arising from testing for remediation 25. the common security and privacy risks that affect IIoT solutions and the methods that mitigate them

TECIS1201404



Test Industrial Internet of Things (IIoT) systems

Developed by	e-skills
Version Number	1
Date Approved	12 Feb 2021
Indicative Review Date	31 Mar 2024
Validity	Current
Status	Original
Originating Organisation	ODAG Consultants Ltd.
Original URN	TECIS1201404
Relevant Occupations	Information and Communication Technology Professionals
Suite	IT(Networking)
Keywords	IIoT, IoT, Industry 4.0, networks
