



Introduction to test

- for self study

A Great European bank, acknowledged for its people, creating superior value for customers and shareholders



Testing Methods, Tools and Support - Nordic
October 2015

Making it possible

The aim of this material is for you to acquire general and overall knowledge about Test in Nordea.

Detailed information about Test and Test processes can be found:

- in the Test portal, in Step In
- Test toolbox, Nordea intranet (- called 'Intra')

Purpose of this 'Introduction to test'

For whom?

- For new EDC IT resources – regardless of your IT role

What is it?

- A brief introduction of the testing principles in Nordea
- A self study material

After having taken part of this information you will

- understand the Nordea ambition level regarding quality assurance by test
- be aware of the governing documents and the main principles in test
- understand the purpose of aligning to a corporate common test standard
- understand the purpose of early involvement
- know where to find information regarding Test
- know how to get support on test issues

Content

- Some basics about test (in short)
- Test in Nordea – introduction
 - Test in the Development chain
 - Mandatory in Test
 - 01 Nordea Test Policy & Nordea Test Strategy
 - 02 Test Quality Checks & Gates
 - 03 International Test Standards
 - 04 Test Processes
 - 05 Test Templates
 - 06 Test Metrics
 - 07 Test Data & Test Environment Governance
 - 08 Functional & Non-functional Testing
 - Tools
 - Support





- **Some basics about test**

- **Test in Nordea**

- Test in the Development chain
- Mandatory in Test

01 Nordea Test Policy & Nordea Test Strategy

02 Test Quality Checks & Gates

03 International Test Standards

04 Test Processes

05 Test Templates

06 Test Metrics

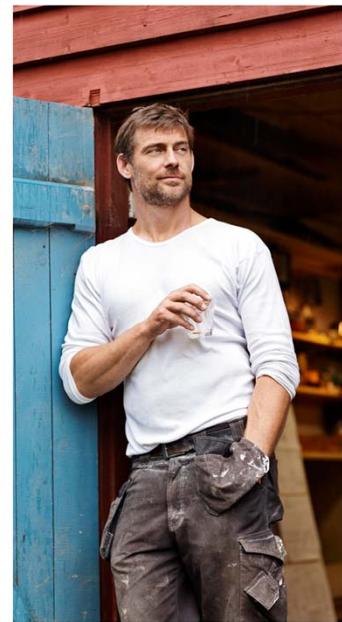
- Tools

07 Test Data & Test Environment Governance

- Support

08 Functional & Non-functional Testing

Why Test?



Nordea

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Quality

By adding the right test approach to each software development activity will increase the quality in every delivery to deployment. Doing the testing the right way is the key to increase the quality in our deliveries.

- Measure the quality of the software system
- Give the confidence of the software system
- Increase the quality of the software system if defects are fixed correctly
- Help building in the quality of the software system

Cost Savings

Failing software in different contexts will cause different problems. May cause loss of money, time and business reputation.

To find an error as early as possible in the development phase will make the correction less expensive to change. That's a fundamental in Nordea's Test Strategy, to have test involved as early as possible.

Reduce operational risk

Test is the key to deliver with high quality and mitigate the operational risk in our systems. Any failure in our daily operations will have an impact to our customers which is not acceptable.

Great Customer Experiences

Our primary focus area and one of Nordea values is “Great Customer Experience”. Everything we do in our daily work must be related to this value and Test’s contribution in order to support the Great Customer Experiences is to deliver on the three bullets above.

Testing in brief

- Testing is the process of executing a program or system with the intent of finding errors.
- Testing reduces risk and mitigates cost.
- Testing demands enough time and resources – including proper test environments and test data.
- Testing activities take typically up 30-40% of the total effort of a project.
- Testing provide information for improve quality of the IT solution. (It is not a bug-free guarantee.)
- Test should cover both specifications - e.g. reviews (Static testing) and installed IT solution e.g. program execution (Dynamic testing).
- Functional testing checks *WHAT* the system does.
- Non-functional testing checks *HOW* the system does it – fast, on time, reliable etc.



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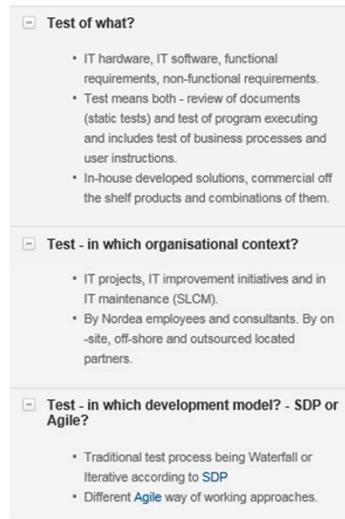
- Testing is the process of executing a program or system with the intent of finding errors.
- Organization should offer enough time and resources - also proper test environments and test data – to ensure that the best possible testing to take place.
- Software test is like insurance, it reduces risk and mitigates cost.
- Software test is of high importance and test related activities should typically take up 30-40% of the total effort of a project
- Test will not make the software bug-free, but it will provide the information needed in order to increase the quality of the software.
- Test should be done both on specifications (reviews, walk through solution sessions) and the executable software, allowing early defect prevention and cost escalation in a project.
- Functional testing investigates *WHAT* the system do; calculate interest rate on saving account, display the 20 most recent transactions on selected account etc.



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What do we target when addressing Test in Nordea?

- Test of IT Hardware
- Test of IT Software
- Test of Documents (Static test)
- Test in Project, Improvement, Maintenance
- Test by Nordea employees and consultants
- Test working Agile or Traditional



IT Hardware – new hardware almost always implies new configuration (= software)

e.g. new server solution

IT Software test – Nordea developed systems

Bought applications so called COTS (= Commercial Off The Shelf software)

Document test – Often called Static testing when no code execution take place

e.g. test of

- Requirement documentation,
- Code before it is executed (e.g. the developer goes through the code and explain for a developer colleague or software architect)
- User instructions,
- Business processes (a combination

of manual routines and SW usage – test that you get the support you need in different process steps)

Test by Nordea employees and consultants. External vendors assisting in implementation of solution we have bought in Nordea (COTS) need to align to our Test strategy.

Working Agile or Traditional – traditional = waterfall or iterative according to SDP (Software Development Process, a Nordea implementation of RUP)

=> ‘Mandatory in Test’ is applicable in all these test situations

Test Portal – ‘Mandatory in Test’ and more

The Test portal provides with:

- *Test orientation*
- *Storage place for test guidance documents and test templates*

Test portal is placed in Step In > Knowledge area > Test, where you will find all necessary information for performing test according to the Nordea standard.
<https://confluence.oneadr.net:8443/display/Test/Test>

Test Portal & the Nordea Test Strategy document

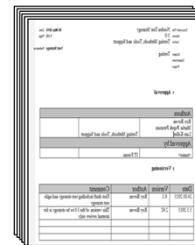
Test Portal

- Overview
- Access to Nordea Test Policy and Test Strategy and actual test templates

The screenshot shows the 'Test' section of the Nordea Test Portal. The main content area displays a page titled 'Testing is not the last thing we do!' which includes a brief introduction, a 'Support' link, and a 'Test Portal access from here start' button. Below this, there are three expandable sections: 'Test of what?', 'Test - in which organisational context?', and 'Test - in which development model? - XP or not?'. The left sidebar lists categories such as 'Project', 'Test', 'Variables for Test', 'Contexts & Initiatives', and 'Report formats'.

Nordea Test Strategy

- "The Test Handbook"



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Nordea Test Strategy contains many details on different subjects.



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Test and System Development

How Test is related to other parts of System Development can be found **in Step In:**

The screenshot shows the 'Knowledge areas' section of the Nordea Step In application. The 'Development' category is highlighted with a red oval. The 'Test' item under 'Development' is also circled in red. Other categories like 'Management' and 'Other' are visible but not circled.

Category	Item
Management	Project Management
	Business Case Management
	Programme Management
	Improvement Management Model
	Various tools & techniques
Development	Software Delivery Handbook
	Requirements
	Test
	SDP Framework
	Process and Business Modelling
	Architecture
	Integration
	Mainframe development
	User Experience & User Interface D...
Other	Governance
	IT Process Portal
	Project Portfolio Management
	Project Compliance Report
	Application Portfolio Management

These pages contain links to the test pages – the 'Test portal'

From Step-in application, Knowledge area start page.

Test from a Governance System Development perspective

How Test is related to other parts of the System Development Governance can be seen in

Governance portal

About what is needed to get compliant with Nordea IT standards in system development.

The screenshot shows the Nordea Governance portal interface. At the top, there's a navigation bar with links for 'Nordea', 'Step In', 'Knowledge areas', 'Tools', 'Community', 'Teams', and 'Projects'. Below the navigation is a search bar labeled 'Search this space' and a sidebar titled 'Governance' with a 'Recent activity' section. The main content area is titled 'Change governance' and includes a 'Created by' and 'Modified by' timestamp. It features a stylized illustration of people at a meeting. Below the illustration, there's a section titled 'What are the latest changes to governance? (incl lync recording of introduction sessions)' with a link to 'Click here to expand...'. Further down are sections for 'Project governance' and 'System development governance', each with a brief description and a link to 'Read more'. The bottom of the page has a 'Nordea' logo.

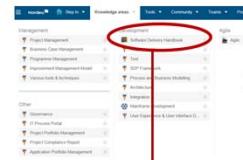
Software Delivery Handbook: placed in Step-in > Knowledge area

<https://confluence.oneadr.net:8443/display/SDHB/Software+Delivery+Handbook>

"A software delivery handbook is a place for a software team to find all the guidelines, instructions and templates for their daily work, from common Nordea-level principles to the team-specific (and team-made) hands-on guides."

Test in the System Development Process

How Test is related to other parts of the System Development Process can be seen in the ..



Software Delivery Handbook

*About how to reach your goals in the Development process:
- all the guidelines, instructions and templates for a software team, from common Nordea-level principles to the team-specific hands-on guides.*

A screenshot of the Software Delivery Handbook page in the Nordea Confluence space. The top navigation bar includes 'Nordea', 'Step In', 'Knowledge areas', 'Tools', 'Community', 'Teams', 'Project', and a search bar. Below the header, there's a 'Create' button and options to 'Edit', 'Watch', and 'Print'. The main content area shows the title 'Software Delivery Handbook' and a brief description: 'Created by spacecreator, last modified by Kirsten Andersson o'. It features a diagram illustrating the 'System Development' cycle, which includes 'Business Strategy', 'Software Delivery', 'Requirements', 'Development and Test', 'Review and Deploy', and 'Management'. The page also contains a sidebar with links to various handbook documents and a search bar.

Software Delivery Handbook: placed in **Step-in > Knowledge area**

<https://confluence.oneadr.net:8443/display/SDHB/Software+Delivery+Handbook>

“A software delivery handbook is a place for a software team to find all the guidelines, instructions and templates for their daily work, from common Nordea-level principles to the team-specific (and team-made) hands-on guides.”



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Mandatory in Test

- From Test portal

- where you can find what is mandatory in Nordea:

The screenshot shows a web interface for the Nordea Test portal. At the top, there is a header with the Nordea logo, a search bar, and a 'Step In' button. Below the header, there is a navigation bar with icons for home, test, and other options. The main content area is titled 'Mandatory in Test'. This section contains a list of eight items, each preceded by a small square icon:

- 01 Nordea Test Policy & Nordea Test Strategy
- + 02 Test Quality Checks & Gates
- 03 International Test Standards
- + 04 Test Process
- 05 Test Templates
- 06 Test Metrics
- 07 Test Data & Test Environment Governance
- 08 Functional & Non-Functional Testing

Mandatory in Test

..and what is it?

The screenshot shows a web-based document titled "Mandatory in Test". At the top, there is a header with the Nordea logo and a "Step In" button. Below the header, there is a navigation bar with icons for "Test" and "☰". The main content area is titled "Mandatory in Test" and contains a bulleted list of items. To the right of the list, there is a vertical sidebar with numbered items from 01 to 08, each preceded by a small square icon.

Item	Description
01	01 Nordea Test Policy & Nordea Test Strategy
02	02 Test Quality Checks & Gates
03	03 International Test Standards
04	04 Test Process
05	05 Test Templates
06	06 Test Metrics
07	07 Test Data & Test Environment Governance
08	08 Functional & Non-Functional Testing

Nordea

- 1 One page = “Policy” **Nordea Test Policy** + A Test Handbook = **Nordea Test Strategy**
- 2 Two Quality assurance steps: ‘IT Quality Check list & Production Gate’
- 3 ISTQB® **which recommends use of IEEE templates**
- 4 Traditional and Agile - **no big difference between them regarding what to accomplish in test – ISTQB is the common basis**
- 5 Seven Templates at the most – **if no test tool is used and the initiative requires both Master and Level test plans and reports = not a realistic scenario**
- 6 Three Metrics
- 7 Guide what to require for test - **regarding Test Environment and Test Data**
- 8 Definitions what to be taken into account – **mainly a description of the kind of non-functional tests we need requirements on for test**

Test compliance follow-up in Nordea

Follow-up activities on adherence to Mandatory in test

- **Regularly test compliance Reporting from Business IT areas**
- **IT Quality Checklist** checks for projects
- **Production Gate** checks
- **Test Metrics** – defect follow-up in production mode
- **Regular Spot-checks** of test compliance in e.g. a project
- **Quality reporting** – routine for assess and report on main test focus areas
- **Incident, Problem and Change process** checks
- **TRRD** - Technical Restore and Recovery Documentation, based on regularly tests
- **Audit**



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Regularly reporting from Business IT areas: adherence to e.g. Test process and instructions, mandatory Metrics used.

Examples of Audit checks :

1. That test instruction for Agile and Traditional way of working are followed
2. That mandatory test documentation is produced
3. That mandatory test metrics are used
4. That non-functional testing (application) take place
5. That Automated testing is used

IT Quality Checklist - that artefacts/deliveries from test are produced and approved at each project tollgate

Spot-checks from Testing Methods, Tools and Support department

Spot checks of e.g. test in a project

Quality reporting focus areas:

Always tested in production like test

environment

Compliance with the Nordea Test Policy and Strategy

Non-functional requirements are defined and test case covered

Prioritized test cases passing

Relevant Test Data always present

Secure Decision (*e.g. documented meeting minutes regarding test data and test environment*)

Routine for assessment and reporting on the quality areas

Incident, Problem and Change process checks

- Example – there are test checks in the tool Remedy – the current tool for supporting the process

(Remedy is a tool for initiate, monitor and follow-up changes in IT Production environments)

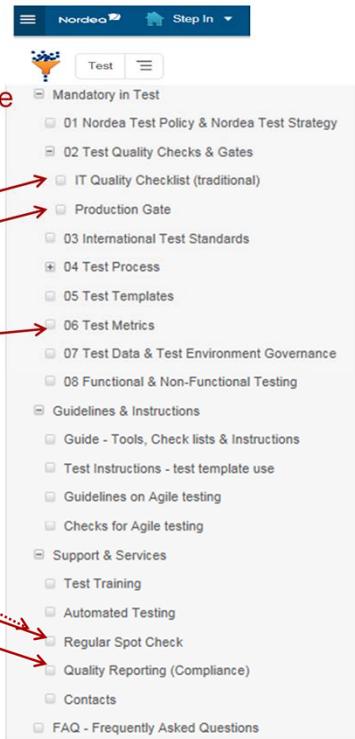
The checks supports production gate keeping.

TRRDs are documents that contain instructions for restore and recovery of a system, application, server or platforms. Example: TRRD needs to tested *every* year for so called business critical applications.

Mandatory & Follow-up – Guidelines etc.

Links and supportive material for follow-up on adherence to 'Mandatory in Test' available from Test Portal:

- Regularly reporting from Business IT areas
- IT Quality Check list for projects
- Production Gate checks
- Test Metrics
- Spot checks
- Quality reporting
- Incident, Problem & Change process checks
- TRRD
- Audit



Regular Spot Checks – Test Quality Assurance

Regular Spot Check for projects, improvements and maintenance to secure that:

test instructions, templates and guidelines are used, understood and followed.



Regular Spot Checks



Regular Spot Checks



Quality reporting – for awareness of important test areas

Quality reporting is like a checklist on quality, to ensure when setting up the test approach and writing test documents, that all focus areas are covered.

Main Focus Areas:

- Always test in production like test environment
- Compliance with the Nordea Test Policy and Strategy
- Non-functional requirements
- Prioritised test cases passing
- Relevant test data always present
- Secure decision

The screenshot shows a web-based application titled "Quality Reporting (Compliance)". At the top, there's a navigation bar with "Nordea" and "Step In". Below the title, there's a section for "Test" and a "Report" button. The main content area is divided into several sections:

- Test Overview:** A brief summary of the test status.
- Test Details:** A detailed breakdown of the test environment, including hardware, software, and network configurations.
- Test Plan:** A list of test cases and their status (Passed, Failed, Pending).
- Test Results:** A summary of the test results, including success rate and failure details.
- Test Metrics:** Performance metrics such as execution time, memory usage, and CPU load.
- Test Logs:** Detailed logs of the test execution process.
- Test Artifacts:** Links to download test reports and other supporting documents.
- Test Summary:** A final report summarizing the test findings and conclusions.
- Test Report:** A detailed report of the test results, including a table of test cases and their outcomes.



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Nordea Test Policy version 1.0

Defines Nordea's testing philosophy as a whole and provides a direction which everybody working with IT changes must adhere to and follow.

Nordea

Issued: 2010-12-15
Version: 1.0
Page: Page 1 of 1

Nordea's Corporate Test Policy

The purpose of the Test Policy document is to represent Nordea's testing philosophy as a whole and to provide a direction which everybody working with IT changes will adhere to and follow.

The Test Policy applies to both new projects and system maintenance, for in-house development as well as for outsourcing and off-shoring partners and for introduction of commercial off the shelf products.

Purpose of testing

In Nordea we strive for high quality and stability of our IT deliveries. In order to achieve this, all releases to production must have been subjected to structured test before deployment.

Testing is done to

- Reduce operational risk in systems before they are deployed to production
- Improve the satisfaction of the business receiving the delivery
- Ensure that the software is delivered in accordance with its requirements, both functional and non functional.

Test principle:

The test organization within Group IT will outline the Test Policy into general strategies for test methodology and test infrastructure in compliance with Nordea's security standards. Test processes, techniques and templates will be based on international standards.

For each IT change the responsible unit will establish relevant change specific test approach and test plan aligned with Nordeas general test strategies and methods referred to above.

Risk driven test must be applied, to ensure that test activities are prioritised, based on risk and impact.

Quality level to be achieved

Test results including outstanding defects must be documented prior to product release, and release decisions will be based on these results.

Prior to releases of software to production, all defects found for the system(s) shall be handled according to a defined defect process, ensuring that risks related to these defects are mitigated.

Approach to continuous improvement

The test organization must strive for continuous improvement based on learning, best practices and project evaluations done as part of the PM4U framework and the ITIL framework.



Introduction

The Nordea Test Policy was approved by IT Forum 21 March 2011. It is the foundation for the test governance framework that serves the purpose of ensuring that test as part of IT development is utilizing best practices and is run efficiently.

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Testing is done to

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Test principles

Group IT will outline the principles of the Test Policy into general strategies covering test methodology and static test in accordance with global standards such as;

- ✓ the V-model,
- ✓ IEEE 829 Standard for Software Test Documentation,
- ✓ ISTQB Software Testing Terms

The Nordea Test processes, techniques and templates will also be based on international standards.

Our Test Infrastructure is in compliance with Nordea's security standards;

- ✓ Operational Risk Framework and
- ✓ the governing standards for common IT development.

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Test Policy version 1.0

Testing purpose

- Reduce operational risk
- Improve the satisfaction of the business receiving the delivery.
- Ensure that the software is delivered in accordance with its requirements - functional and non-functional

Testing principles

- **International standards** and best practise
- **Risk based approach**

Quality level

- **Documented test result**
- Defect handling according to a defined **Defect process**



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- Improve the satisfaction of the business receiving the delivery.

- Ensure that the software is delivered in accordance with its requirements, both functional and non functional.

Test principles

International standard for test = in accordance to ISTQB® (and the standards recommended by ISTQB®)

(Our Test Infrastructure is in compliance with Nordea's security standards.)

Risk driven test must be applied, to ensure that test activities are prioritised, based on risk and impact.

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Approach to continuous improvement

The test organisation must strive for continuous improvement based on learnings, best practices and project evaluations done as part of the SDP-, PM4U- and the ITIL-framework.

Nordea Test Strategy version 3.0

Early Test Involvement
Documented Test
Reusable Test ware
Same deliveries in all projects / improvement initiatives in Nordea
Prioritize test – Risk based testing
Traditional (iterative and waterfall) and Agile processes
Defect management procedure
Metrics
One common test foundation in Nordea
Guidelines on many details
Tool usage

The screenshot shows a Microsoft Word document titled "Nordea Test Strategy Version 3.0". The "Approved by" section contains handwritten red text: "Approved by IT Forum 11th June 2015". The "Versioning" section shows two entries:

Date	Version	Author	Comment
24.03.2015	0.1	Ray Boven	First draft including test strategy and agile test strategy.
3.5.2015	2.92	Ray Boven	This version of the 3.0 test strategy is for internal review only.



The Nordea Test Strategy outlines the framework for testing and advises on the principles and approaches in the following areas:

- Test Terminology – The ISTQB® vocabulary.
- Test Processes to be used – for traditional and agile way of working.
- Test Infrastructure – Introducing the Test Environment Strategy.
- Test Methods including Defect management.
- Test Metrics.
- Test Automation.
- Test of Non-functional requirements.
- Test Tool usage.

The Nordea Test Strategy advocates for;

- Early Test Involvement** - find and solve errors early have less impact on overall costs and increase quality of delivery.
- Documented Test** - is needed in order to be able to determine test coverage and completeness of test.
- Reusable Test ware** - test documents and other test artefacts can be reused in future tests, if documented, which saves time and costs.
- Same test deliveries in all projects in Nordea** - enables flexibility between different test initiatives, increases the test maturity and test awareness.
- Risk based test** - test will target highest risks early and thoughtfully

Test automation is an investment - in time and quality and will be utilised as early as possible in the software development process.

Common terminology - ISTQB® Glossary

All test terminology used in Nordea must be based on the ISTQB® Standard Glossary of Testing Terms. The ISTQB® Glossary is used as a reference document for the International Software Testing Qualifications Board (ISTQB®) software testing qualification scheme, and it supports communication within testing community.

Traditional and Agile processes

Waterfall model (seldom applied) and Iterative test model in Nordea follow the 'SDP' - System Development Process, the Nordea development process to use for projects that include IT development. It is a modified version of RUP (Rational Unified Process); a de facto standard accepted worldwide. The process covers all aspects of the development process.

Test automation

Test automation should be utilized as early as possible in the software development work as an integrated part of software development.

Common test tool for test management

Quality Center is one of two recommended test management tool in Nordea. By having a common project set up in the same tool every time, all stakeholders will easily recognize the deliveries from the test process, such as e.g.;

- Test cases
- Test reports
- Defect reports

//

We will now continue to take a look in to some of the highlights in the test strategy:

One common test foundation in Nordea

- Documented test – according to mandatory test templates.
- Reusable test ware – used test should be documented order to e.g. secure that test results can be replicated or used as a basis for problem management.
- Same deliveries... – e.g. for both traditional and agile way of working and for different IT initiatives (projects, improvements and maintenance assignments).
- One common test foundation - same test terminology, same approach to test, mandatory in test, common templates and test metrics
- Guidelines on many details in the Nordea Test Strategy

Documented Test Strategy	Version 3.0	Approved	05 May 2010	Save	1/19	Page
Author	Testing Methods, Tools and Support	Test Strategy	Relevance			
Subject	Testing					
Department	Project					
Project						
Early Test Involvement						
▪ Documented Test						
▪ Reusable Test ware						
▪ Same deliveries in all projects / improvement initiatives						
Approvals						
Comments						
Metrics						
Version	Author	Comment				
3.0	Rey Boven	This document including test strategy and agile				
3.0	Rey Boven	This version of the 3.0 to be strategy is for internal review only				
▪ One common test foundation						
▪ Guidelines on many details						
Tool usage						

Nordea

The Nordea Test Strategy contains more details than you will find in the Test Portal.

Early test involvement

Implementing test as early as possible in the development phase will lead to;

Test Type	Test Focus	Test Phase
Unit Test	Unit Test	Development
Integration Test	Integration Test	Development
System Test	System Test	Development
Acceptance Test	Acceptance Test	Development
Performance Test	Performance Test	Development
Risk Based Testing	Risk Based Testing	Development, Test and Deployment
Exploratory Testing	Exploratory Testing	Development, Test and Deployment
Code Review	Code Review	Development, Test and Deployment
Peer Review	Peer Review	Development, Test and Deployment
Inspection	Inspection	Development, Test and Deployment
Review	Review	Development, Test and Deployment
Testing	Testing	Development, Test and Deployment
Testing	Testing	Deployment

Increased Quality – Less errors deployed into production

Quality...

Reduced cost – Find and correct errors early is less expensive,

Cost savings...

Reduce operational risk...

Operation stability – Mitigation of risk finding surprises after deployment

Great Customer Experiences...

Great Customer Experiences – Main focus of all our deliveries



Errors found and solved early in a project will have less impact on the overall cost and quality of the project. The cost of a defect in a development project will increase during a project's lifecycle, hence discovering the defect as part of a review of requirements in the first phases of a project is much more cost effective than discovering the same defect in the final user acceptance test or even in production.

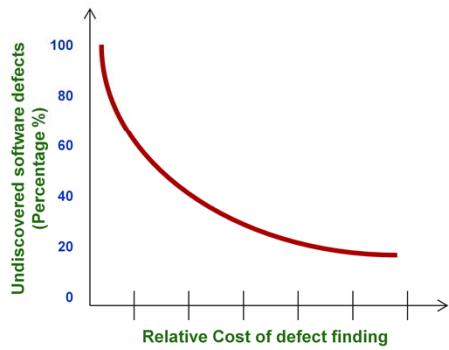
Early test involvement is achieved by utilizing a framework to support test of individual components, applications and interfaces of the project. This happens by addressing the test in multiple test phases, which targets the different deliveries, expanding the scope of the test over time and reducing the operational risk. It should be noted that the test starts simultaneously with the definition of the project, long before any coding, and carries through the entire lifespan of the project. Reviews and inspections play an important part of the early test activities.

Early test involvement

Issue Type for being found	Relative Cost for finding
Crash	Very High
Low level functional	High
Medium level functional	Medium
High level functional	Low
System	Very Low

Cost of defect Detection

The cost of finding defect is less if it is done in an early stage.



Early test involvement

Defects found and solved early

in a project will have less impact on the overall cost

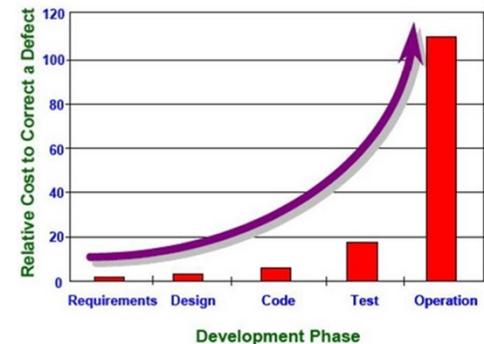


Relative cost to correct a requirement defect is depending on when it is discovered.

(Source: Grady, Robert B. 1999. "An Economic Release Decision Model: Insights into Software Project Management.")

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Risk Based Testing – Approach

Testing is about reducing risk.



- **Risk based testing means that the main focus for test is to target the Product risks connected with the IT solution.**

The most risky parts of the IT solution need to be prioritised in Test in all aspects; in time, part of test scope, test planning and preparation effort, test resources usage etc.

Input for risk based test:

- Product risks are assessed and documented in the architecture document (Software Architecture Document).
- Product risks are assessed in Quality and Risk Analysis (QRA) sessions and documented in the QRA tool.



Software Architecture Document (SAD) is a mandatory document in project.

Distinguish between project risks and product risks!

Product risk is the risk associated with the software or system. These risks are the ones that constitute the base for risk test approach.

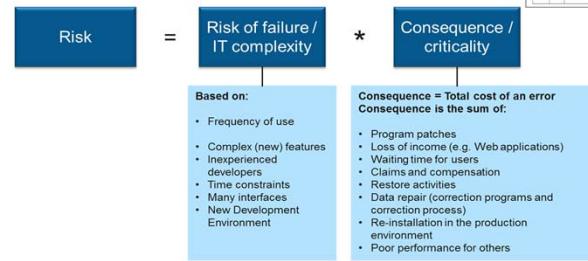
Project risk is risk which can endanger the test project.

Example of project risks – get test resource assigned to project on time, delay in getting testable artifacts in a story, test environment

Is not available

Risk Based Testing

Define the depth of testing upon the risk level expected.



These risks are the ones that are constitute the base for risk test approach.

Examples of **product risks**:

- User interface is complex or confusing
- System functions properly but very slowly
- Software having multiple language interfaces to cater to different countries there could be problems related to time zones, currencies, languages etc.

Risk Based Testing – how to do it

Product Risk Assessment, steps to follow are:

- Determine Test Objectives
- Determine Risk Classes



- Determine the test intensity
- Assign Test Techniques
- Determine on the basis of test intensity and quality characteristic which test design techniques should be applied

The following line up is based on best practices:

- Risk Prioritization Number 12 - 16: pairwise testing, McDc
- Risk Prioritization Number 6 - 9 : equivalence classes, exploratory testing, checklist
- Risk Prioritization Number 1 - 4 : boundary value analysis, error guessing, checklist
- Report on product Risks



McDc (Modified condition decision coverage)

Defect management

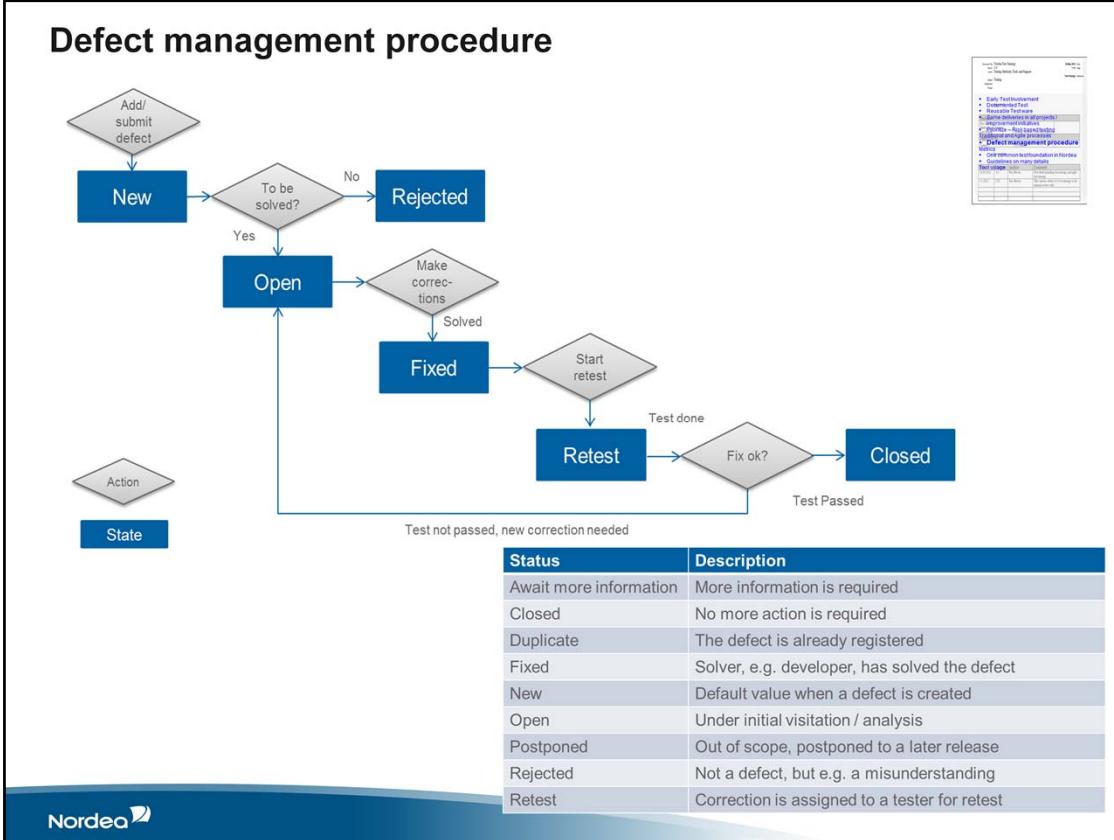
1. Use a tool for [defect management](#)
 - to report and keep track of defects, to easily catch values for test metrics
2. Use the common defect management tools
 - to get the same handling and reporting for all projects and improvement initiatives

Available defect management tools are

 - HP Quality Center (QC)
 - Jira with Zephyr plug-in
3. Use the common defect management procedure
 - to ensure recognition and consistency across IT Business Areas



Defect management procedure



Recommended defect procedure.



- Some basics about test
- **Test in Nordea**
 - Test in the Development chain
 - **Mandatory in Test**

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08 Functional & Non-functional Testing

• Tools

• Support

02 Test Quality Checks & Gates

IT Quality Check list for Projects;

- Valid for traditional projects (not using agile set-up).

- Lists artefacts to be delivered from each delivery stream in order to pass project the quality gates.

IT Test manager responsibility:

- Tests executed according to Test plans.
- Test report approved in accordance with Exit criteria in Master Test plan.
- IT Security test performed, documented, reviewed and approved.
- IT Vulnerability scan of the production environment performed, documented, reviewed and approved.

Area	Principle Impact	IT Quality Criteria					
		SI	SI	SI+	SI2	SI	SI
High	High impact, part of the Quality Function	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Medium	Medium impact, part of the Quality Function	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Low	Low impact, part of the Quality Function	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Very Low	Very low impact, part of the Quality Function	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
None	None	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
High	High impact, critical to the delivery and quality	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Medium	Medium impact, critical to the delivery and quality	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Low	Low impact, critical to the delivery and quality	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
Very Low	Very low impact, critical to the delivery and quality	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
None	None	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
High	High impact, critical to the delivery and quality	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete
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None	None	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete	Incomplete



IT Quality Checklist is also called Project Quality Checklist.

It supports ensuring that the solution will be on sufficient level of quality.

List what is needed to pass different project gates.

Tips to test manager: See what other project streams will deliver!

Production Gate



Routine to document that proper testing

– functional and non-functional – has been carried out. Assess risk and impact.

Mandatory for changes to Production environment.

The main purpose is to support operational stability. More data regarding 'risk and impact of changes' is collected in order to target future improvements.

9 Risk Assessment Questions

Example:

- The change has been tested according to Nordea Test policy?
- Appropriate non-functional test has been performed?
- Appropriate functional test has been performed?
- Appropriate test is performed verifying that vital interdependent services/system still work as they should?



Answering 'the 9 Risk Questions' will be **mandatory** in the IT Service Management tool on all Normal, Expedited and Emergency Changes to Production. (= almost all changes)



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• Tools

• Support

03 International Test Standards

We use one International standard on testing - ISTQB®:

Nordea Test Policy and Test Strategy, the test process, the templates etc. is aligned with ISTQB® and the standards that ISTQB® recommends e.g. to use the test templates from the standard IEEE (Institute of Electrical and Electronics Engineers).

Benefits from ISTQB®

- One way of working - one common culture
- One clear approach for testing in all Business IT Areas
- Possible for anyone with ISTQB® knowledge to manage test
- Easy maintenance - the standard is not invented and maintained in Nordea
- Common test process - knowledge sharing, re-use, measurable

Example: Collecting the same Metrics in all IT divisions – then the test coverage and quality of testing becomes comparable all over the business areas.



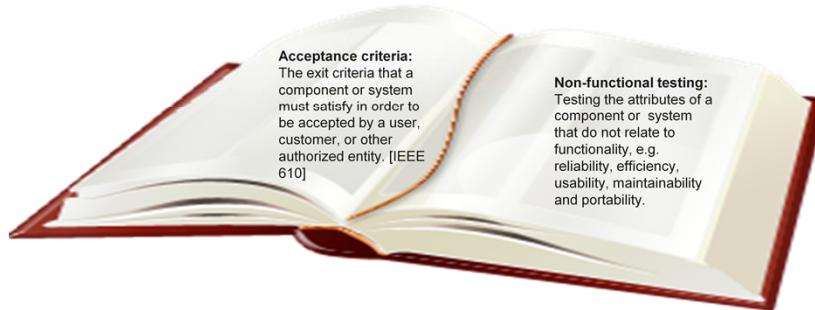
Nordea



An IEEE standard for documenting the testing of software. The standard typically applies to any stage in the testing of developing software, and each stage in the software's development typically is documented using the same application of the standard. The IEEE specifies eight stages in the documentation process, each stage

Test Glossary

Terminology based on the ISTQB® Standard Glossary of Testing Terms to secure good communication.



Download
document:
www.ISTQB.org

Download
App

Nordea

40 •

Details of ISTQB is to be found at ISTQB homepage, www.ISTQB.org

ISTQB® Vision

To continually improve and advance the software testing profession by:

Defining and maintaining a Body of Knowledge which allows testers to be certified based on best practices, connecting the international software testing community, and encouraging research.

Benefits by using the ISTQB in Nordea

- Using a commonly accepted and standardized vocabulary ensures that consultants, offshore partners and newly employed testers will have a lower introduction cost.
- By having a common test terminology Nordea will secure that both external and internal project participants have the same understanding of the expression used. All stakeholders will easily communicate with the test resources and they also recognize the meaning of the deliveries from the test process, for instance test reports.
- The participants in the development projects will find it easier to reprocess their test activities if the terminology is well defined and reusable. Thereby it will be easier to reach the same level of quality in different projects

Glossary has two main objectives:

1. Support the understanding of ISTQB syllabi by defining the terms used in the various syllabi
2. Support communication within the international testing community and with its stakeholders by providing a standard testing vocabulary.

Refer to Requirements Glossary REQB which is aligned with ISTQB.

Examples of frequent used test terms

Static test

Review of requirement documents, design and specification documents and program code.

Dynamic test

Test Levels

- Unit test - test of code and components, against program specifications
- Integration test - test of integrated units, against technical design specifications
- System test - test of integrated system against system design document
- Acceptance test - test against business requirements, acceptance criteria

Test Types

These type of test can take place in all dynamic test levels:

- Functional Test
 - Non-Functional Test
 - Re-test
 - Regression testing
- } - to ensure IT solution is made according to requirements
- to check that defect fix is ok
- to ensure that defects not have occurred in unchanged parts



Static test = practise swimming strokes out of the water

Dynamic test = test including IT solution execution

Integration test – example: test of execution where programs call each other

Non-Functional Test – there are lot of different words used. Stick to the ones that are mentioned are mentioned in ISTQB®.



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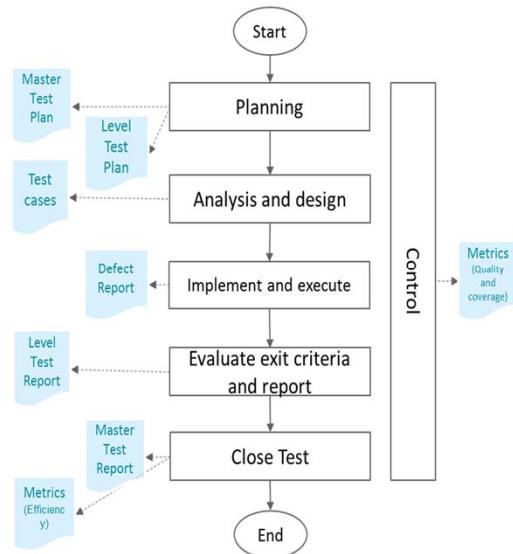
- Tools
- Support

Test Process

- One test process supports traditional system development process models (waterfall and iterative model) and one supports different agile approaches.
- Both test processes are based on the ISTQB® '*Fundamental Test process*' and aligned with Nordea Test Policy and Nordea Test Strategy.

Test Process – Traditional (Iterative or waterfall)

- Based upon ISTQB® a traditional test process is made covering both Waterfall and Iterative processes
- For each step in the process is referred to the IEEE documents to be used
- It is mentioned in the process at which steps the three mandatory metrics should be used
- Is supported by the 'Guidelines & Instructions' in Test Portal



Nordea

ISTQB (International Software Testing Qualifications Board)

Plan test

Purpose is to ensure that test is performed in a structured and controlled way throughout the project lifetime in order to reach high quality of solution delivery.

Plan Test

Description

Determine the scope and risks and identify the objectives of testing.

Assess testability.

Assess risks.

Outline test approach to the first version of Master test plan.

Determine the test approach. Implement the Nordea Test Policy & Strategy.

Determine the required test resources like competences, test environments, equipment, etc.

Estimate test effort.

Schedule test analysis and design tasks, test implementation, execution and evaluation.

Determine the Entry and Exit criteria for test levels.

Get test plan approved by project management.

Roles

Test manager

Templates to use

Master Test Plan

Level Test Plan

Master Test report

Level Test Report

Test Metrics

Control test

Monitor and adjust testing throughout the project lifetime in order to ensure high quality delivery.

Control Test

Description

Assess risks.

Assess resource needs and evaluate estimates for them.

Measure and analyze the results of reviews and testing.

Monitor and document test progress, test coverage and Entry/Exit criteria fulfilment.

Document information about test obstacles and test impediments.

Initiate corrective actions.

Initiate re-test, regression test.

Roles

Test manager

Templates to use

Test metrics template

Test status report template

Test Defect report

Master Test Report

Level Test Report

Analysis & Design Test

Analyse the test basis in order to identify and establish the preconditions for start of testing. Collect test ideas, describe how to implement them.

Analysis & Design test

Description

Review the test basis.

Examine product risk documentation. If not in place - initiate risk assessment workshop.

Evaluate testability of requirements and system.

Identify test conditions.

Collect test ideas - plan and conduct test workshop.

Design the tests - what to test, how to test, a structure for test cases etc.

Identify and require test environment set-up, infrastructure and tools and test data.

Roles

Test manager

Test team member

Templates to use

Master Test Plan

Level Test Plan

Implement & Execute tests

Make all preparations that are needed before start the test execution.

Start test execution when test Entry criteria is met. Run test, measure and report on test.

Implement & Execute tests

Description

Implement test

Set up the test environments and verify them.

Set-up of test tools.

Creating and detailing the test cases and the structure around them e.g. test suites, test data and test automation scripts.

Prioritize the tests.

Create test information material.

Conduct Test training.

Execute tests

Execute test and regression tests according to plans, using test cases.

Report defects.

Re-test fixed defects.

Document use of test wares; record identities and versions etc.

Document problems that prevents from test continuation.

Measure test.

Roles

Test manager

Test team member

Templates to use

Master Test Plan

Level Test Plan

Metrics

Evaluate exit criteria & Report

Evaluate the collected test metrics against exit criteria and the impact of other circumstances that have effected performed tests in order to form a basis for decision about stop or continue testing for the actual test level or test type.

Evaluate exit criteria & Report

Description

Evaluate test

Check the test logs (monitored results of tests) against the exit criteria specified in test plan.

Evaluate collected metrics.

Evaluate findings in the documents regarding;

use of test wares,

problems occurred during test execution which has caused delays or stop in test.

Assess if more test is needed.

Assess if the exit criteria specified should be changed.

Report on test

Compile test evaluation result into a test report to stakeholders.

Roles

Test manager

Test team member

Templates to use

Level Test report

Close test

Hand over activities to ensure a smooth transition from project to SLCM organisation and enable re-use in maintenance of artefacts produced by test team. Closure tasks before delivering the tested solution for production setting and continues afterwards.

Close test

Description

Check which planned deliverables is actually delivered.

Reach agreement with receiver (SLCM unit) of tested solution regarding;

- content in 'hand-over package' from test,
- test resource 'stand-by'-availability during guarantee period (after go-live).

Finalize 'the test hand-over package' of re-usable test ware such as

- test procedures
- test cases manual and automated, test scripts, test suites

- test environment descriptions
- test data and test data description
- test tools; the set-up and the corresponding documentation

Handover used test wares to the SLCM organisation

Evaluate how the testing went and gather lesson learned for future projects, iterations or releases.

Roles

Test manager

Test team

SLCM organisation / Provider - value receiver of test artefacts

Templates to use

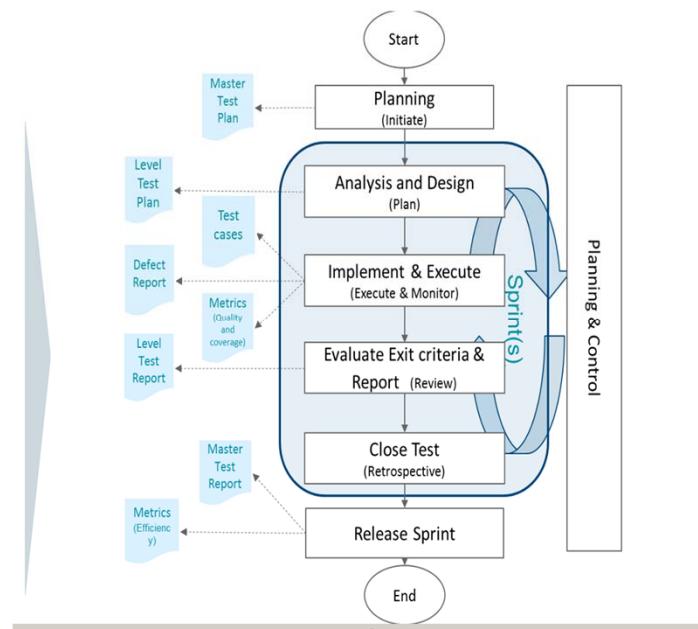
Metrics

Master Test report

Test Process – Agile

Fundamental test process according to ISTQB

- Based upon ISTQB® a traditional test process is made for Agile testing
- For each step in the process is referred to the IEEE documents to be used
- It is mentioned in the process at which steps the three mandatory metrics should be used
- Is supported by the 'Guidelines & Instructions' in Test Portal



Test Process - Agile

Working Agile, is a different way of working. Agile is all about "Creating Quality Together!".

When working Agile, everyone involved is responsible for the result.

The *Test Process - Agile*, supports Agile development. The process lists the test activities within each sprint instead of containing phases like in the Traditional Process.

Planning (Initiate)

Purpose is to plan the activities needed for testing for the complete Project or Release. During this stage the following activities take place:

Planning (Initiate)

Description

Creating Product Backlog for Functional and Non-functional User Stories

Creating Master Test Plan identifying:

Test strategies

Test Automation Areas

Risks (Product Risks and Testing Risks)

Infrastructure needed for testing

Roles

Product Owner

Test manager

Templates to use

Master Test Plan or

Level Test Plan

Planning & Control (Plan)

Purpose is to plan the activities and control all testing activities during the sprint. During this stage the following activities take place:

Planning & Control (Plan)

Description:

Within a sprint, planning is an on-going task. Since a sprint is time boxed, during a sprint it can be decided that tasks (Sprint Backlog items) are removed from the sprint. When this happens, these tasks are put back on the Product Backlog. This also means that the planning of the activities, including test activities is an ongoing process.

- Tracking progress
- Updating Sprint Backlog
- Updating test cases

Roles

Agile Team

Test manager

Templates to use

Level Test Plan or

Level Test Design

Test Cases

Analysis and Design

Purpose is to analyse and prepare the testing of the content of one Sprint. In the Analysis and Design stage, the following activities are to be performed:

Analysis and Design

Description:

Defining Sprint Goal (also for testing)

Identify required tasks and effort for testing team for this particular sprint

Optional, create a Level Test Plan or Level Test Design for this sprint.

Roles

Agile team (including test engineer)

Test Manager (support and test plan)

Templates to use

Level Test Plan or

Level Test Design

Implement & Execute (Execute & Monitor)

Purpose is to Create and execute the test cases. In the Implement & Execute stage, the following activities are to be performed:

Implement & Execute (Execute & Monitor)

Description

Preparation of Test Cases

Creating automated Test Scripts

Unit Testing (automated if possible)

Perform System Integration Testing

Tracking and reporting progress on testing and defects

Roles

Agile team (including test engineer)

Test Manager

Templates to use

Test cases (can also be user stories used as test case, stored in Test management tool)

Defect Report (or a defect management tool!)

Metrics

Evaluate Exit Criteria & Report (Review & Retrospective)

Purpose is to evaluate if the quality of the sprint is acceptable to continue with the next step. The following activities are to be performed:

Evaluate Exit Criteria & Report (Review)

Description

Results of testing are compared to the exit criteria

A test report (can be a light version) is written to make the testing traceable and reproduce able

Roles

Agile team (including test engineer)

Scrum Master

Product Owner

Business

Templates to use

Level Test Report

Close Test

Purpose of this stage is to make sure that all test documentation is preserved. The second goal, main goal of the retrospective, is to get approval from the business that the acceptance criteria are met.

Close Test (Retrospective)

Description

Get approval from business

Preserve all test ware

Roles

Agile team (including test engineer)

Templates to use

-

Release Sprint

The purpose of a release sprint is to perform a complete regression testing and non-functional testing which would not be feasible during regular sprints. User acceptance testing and maybe exploratory testing are also frequently done in this phase..

Release Sprint

Description

Non Functional Testing

Regression Testing

Roles

Agile team (including test engineer)

Test Manager

Templates to use

Metrics

Master Test Report

Further details on Agile Testing

"Creating Quality Together!"

The content is:

- Agile Test Principles
 - One team – all are responsible for result
 - Test early and often
 - Collaborate and communicate
 - Document dynamically
 - Automate test to enable frequent testing
- Roles/ responsibilities
 - Product Owner
 - Test competence / Test manager
- Test Deliverables
- Test Levels
 - "Hardening Iteration"

Guidelines on Testing Agile
Further guidelines on testing in Agile projects.

This page describes some basic guidelines on testing in Agile projects. It is highly recommended to read the "Agile Test Principles" section of this page to learn more about the most common questions about testing in Agile environments and how they are handled here and need to be mitigated upfront.

Agile Test Principles

Before we go deep into the details on testing in Agile environments, it is important to understand the principles on which agile is based. Some of these principles and challenges are mentioned here and need to be mitigated upfront.

- One team approach
 - Unlike Waterfall, in Agile there is no demarcation of development and testing teams. There are cross functional teams and everyone is responsible for the quality of the delivered software.
- Early involvement and testing often
 - Testing professionals need to be involved right from the initial release planning phase. This is needed to ensure the testing activities are aligned with the planning and development activities.
- Collaboration and communication
 - Success of the project is based on the frequent feedbacks by all stakeholders. This means collaboration and communication are of the upmost importance on agile projects.
- Document dynamically
 - There is a misconception that Agile means no documentation. In fact in Agile the documentation is dynamic and evolving. Release/sprint plans, epic/feature documentation, test plan/test scripts are still needed to be created and maintained with the experiments done.
- Automate test to enable frequent testing
 - Waterfall Agile requires testing early and testing often with frequent feedback. The success of the project is based on the frequent feedbacks by all stakeholders. The automation therefore needs to be identified and planned in the very stage to ensure the tests can be run frequently and automatically. This will help to identify bugs at the beginning. Lack of automation while the team could delay the project and reduce the quality of the delivered software.

Role of responsibilities

Since the agile environment is based on the principle that everyone is responsible for the quality of the delivered software, the team is responsible for all others. That means that testing is delivered over the team. Testing is not specifically assigned to one person or one role. Testing is everybody's responsibility.

Test Manager

Since the sprint team is responsible only for the context of work, the Product Owner, marketing, sales, and other stakeholders are responsible for the overall quality of the software. This also includes who is responsible for creating and applying the overall test approach - Master Quality Center (MQC).

Test Deliverables

All testing projects must adhere to ISTQB which is the global testing standard. The test deliverables are:

- Test Plan - provides an overall test strategy and test management approach for the project.
- Test Case - defines the information needed as a product to inputs to test outputs from the system under test. A test case is a specific test scenario with a condition or expected result.
- Acceptance Report / Defect report - documents any defects that occurred during the testing process. This document is submitted to the Product Owner, Marketing, Sales, and other stakeholders.
- Lessons Learned - regular basis to summarize the results of the integrated testing activities and to provide evaluations and recommendations based on these results. Results to be submitted to Master Quality Center (MQC).

Test Levels

The different test levels and test techniques to be used are described in the Test Strategy section. Due to the difference in the traditional approaches, one mentioning here separately.

Marketing Readiness

In Waterfall environments, many sprints are run, before something is going to be implemented into the market. This is not the case in Agile environments. Testing is an iterative process. Testing environment will be tested integrated during a marketing iteration. The purpose is to identify bugs and fix them as soon as possible. This approach is also used for reliability and quality of the software as a whole.

Nordea

• Agile Test Principles

Before we go deep into the details on testing in agile environments, it is important to understand the principles on which agile is based. Some of these principles and challenges are mentioned here and need to be mitigated upfront.

One-team approach

Unlike waterfall, in agile there is no demarcation of development and testing teams. There are cross functional teams and everyone is responsible for the quality of the deliveries.

Early involvement and testing often

Test professionals need to be involved right from the initial release planning phase along with the Product Owner and development team. This is needed to ensure the testing activities to be aligned with the planning and development activities.

Collaboration and communication

Success of the project is based on the frequent feedbacks by all stakeholders. This means collaboration and communication are of the upmost importance on agile projects.

Documentation

There is a misconception that agile means no documentation. In fact in agile the documentation is dynamic and evolving. Release/sprint plans, epic/feature documentation, test plan/test scripts are still needed to be created and maintained with the appropriate detail.

Automation

Working agile requires testing early and testing often with frequent feedback. The scope of testing with reference to regression testing increases with every sprint. Test automation therefore needs to be identified and planned in the early stages to ensure that team members with automation skills are included and involved from the beginning. Lack of automation skills in the team could delay the project and reduce effectiveness of testing.

- **Roles/ responsibilities**

Within an agile team everyone in the team is responsible for the result. All members of the sprint team are responsible for all criteria. That means that testing is divided over the team members. It is however good use to have test (automation) experts taking place in the sprint team.

Two roles are specifically important for test in Agile environments:

Product Owner:

The Product Owner is responsible for the whole product. This also inclines that the Product Owner is responsible for approving the overall test approach / Master Test Plan.

Test Manager:

Since the Agile Team must be cross functional, it is vital it contains the test skills set needed to ensure quality in the software to be delivered. If test skills/knowledge are not present in the agile team a test manager must be added to coach the team and to ensure test planning of features and Non-functional, regression test etc. are conducted in a matter to ensure the quality.

In minor projects with one or few Agile teams the test manager might only be supplied in the team temporarily when needed. Still when being part of the team, the person share the joint responsibility with the rest of the team members.

In larger projects/programs with several Agile teams a test manager should be appointed across the teams to support the teams with test knowledge and planning skills.

- **Test Deliverables**

All testing projects must adhere to ISTQB which is the global testing standard. The test deliverables recommended for agile projects are as below:

Test Plan - provides an overall test planning and test management approach for multiple levels of test.

Test Case - defines the information needed as it pertains to inputs to and outputs from the system being tested. Must relate to a corresponding story / requirement specification. A testable user story together with a prediction of the expected result can be used as a test case.

Anomaly Report or Defect report - documents any defects that occur during the testing process that requires investigation. Must relate to a corresponding Test Case. (To be stored in test tool like e.g. Quality Center - QC)

(Level) Test report – used on a regular basis to summarize the results of the designated testing activities and to provide evaluations and recommendations based on these

results. (Metrics to be extracted from test tool like e.g. Quality Center - QC)

- **Test Levels**

Hardening Iteration

In Many Agile projects, many sprints are run, before something is going to be implemented into production environment. The products from these sprints are to be installed on a Acceptance Testing environment and will be tested integrated during a Hardening Iteration. The purpose is to create a stable and reliable product before the Go Live.

This approach is also used if the reliability or stability of the software is questionable.



- Some basics about test
- **Test in Nordea**
 - Test in the Development chain
 - **Mandatory in Test**

01 Nordea Test Policy & Nordea Test Strategy

02 Test Quality Checks & Gates

03 International Test Standards

04 Test Processes

05 Test Templates

06 Test Metrics

07 Test Data & Test Environment Governance

08 Functional & Non-functional Testing

- Tools
- Support

Test Templates

Test Strategy principles:

- Documented Test
- Same deliveries in all projects / improvement initiatives
- One common test foundation

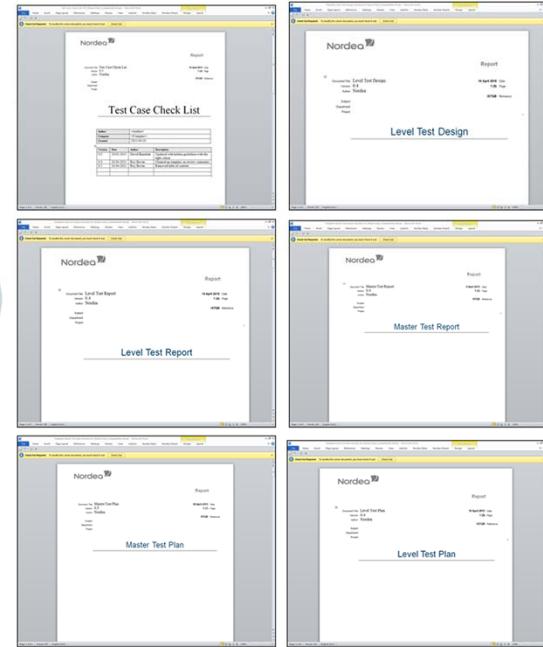
Nordea Test templates are based on:

ISTQB®

IEEE test standards

(Institute of Electrical and Electronics Engineers)

Is supported by the Test Instructions documentation¹



¹ detailed next page

Nordea

- IEEE (Institute of Electrical and Electronics Engineers) templates aligned with ISTQB®

ISTQB® recommends use of the IEEE templates for testing.

IEEE Standards Association Strategy:

- Mission of IEEE-SA

To enable and promote the collaborative application of technical knowledge to advance economic and social well-being through the development of technical standards and related activities.

- Vision of IEEE-SA

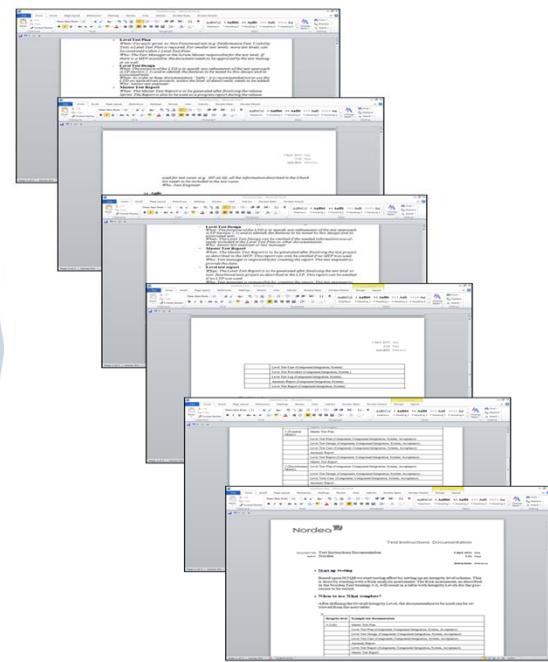
Be recognized as a preferred global provider of high-quality, market-relevant technology standards and of services that promote their universal adoption.

Test Instructions Documentation

For Traditional and Agile Testing

Start up testing:

- Based upon ISTQB® we start testing effort by setting up an integrity level scheme. This is done by starting with a Risk analysis assessment. The Risk assessment, as described in the Nordea Test Strategy 3.0, will result in a table with Integrity Levels for the processes to be tested.
- The object of each template is described, when and how they are to be used.
- The person responsible for each template is listed in the document for both traditional and agile testing.



Test Templates & Guidelines

Test Templates

based on IEEE829-2008

- **Master Test Plan ***
- Level Test Plan
- **Level Test Design ***
- Level Test Report
- **Mandatory Metrics ***
- *Test Case Check List*
- Anomaly Report / "Defect Report"
- can be produced from test management tool e.g.
Quality Center
- **Master Test Report ***

* Mandatory reports

Guidelines

- Nordea Test Strategy
- Guide - Tools, Check lists & Instructions
- Test instructions – test template use
- Guidelines on Agile testing
- Checks for Agile testing



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This slide shows the current set of Nordea Test templates and guidelines. Mandatory documents are *-marked.

Templates

Documented test:

All Projects, Improvements or maintenance areas must follow the same overall framework for test documentation based on IEEE829-2008. The following documents are mandatory (See Test Instructions for details on what document to be used when):

Master Test Plan (*optional only for small projects where this strategy may replace it*) – provides an overall test planning and test management approach for multiple levels of test. Must adhere to this Test Strategy.

Level Test Plan(s) – provides a planning and test management approach to a specific test level (or sprints). Must adhere to the Master Test Plan or to this Test Strategy.

Level Test Design (*optional*) - specifies any refinements of the level test approach and identifies the features to be tested.

Level Test Case - defines the information needed as it pertains to inputs to and outputs from the system being tested. Must relate to a corresponding requirement specification.

(To be stored in HP Quality Center (QC), or in Jira with plug in)

Anomaly Report or Defect report - documents any defects that occur during the testing process that requires investigation. Must relate to a corresponding Level Test Case. (To be stored in HP Quality Center (QC) or Jira plug in)

Level Test Report - on a regular basis (like weekly) summarize the results of the designated testing activities and to provide evaluations and recommendations based on these results. Must refer to the Level Test Plan. (Metrics to be extracted from e.g. HP Quality Center (QC))

Master Test Report - summarize the result of the full test of all levels and to provide evaluations based on these results for release to production. Must refer to the Master Test Plan. (Metrics to be extracted from e.g. HP Quality Center (QC))



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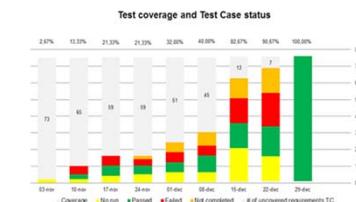
Mandatory Test Metrics – mandatory (page1/2)

Purpose

Test Metrics developed

Non-functional Requirement Test Coverage

- monitor test progress with test case status
- to make sure that all defined non-functional requirements (NFR) have test coverage.



Defect Progress Over Time

- shows the change of open and closed severity 1 and 2 defects during the development phase
- offers an indication whether the progress of the test activity and quality is good or needs to be improved.



Defect Detection Percentage (DDP)

- compare defects found during the development phases and in production
- offers a measure of the testing effectiveness.



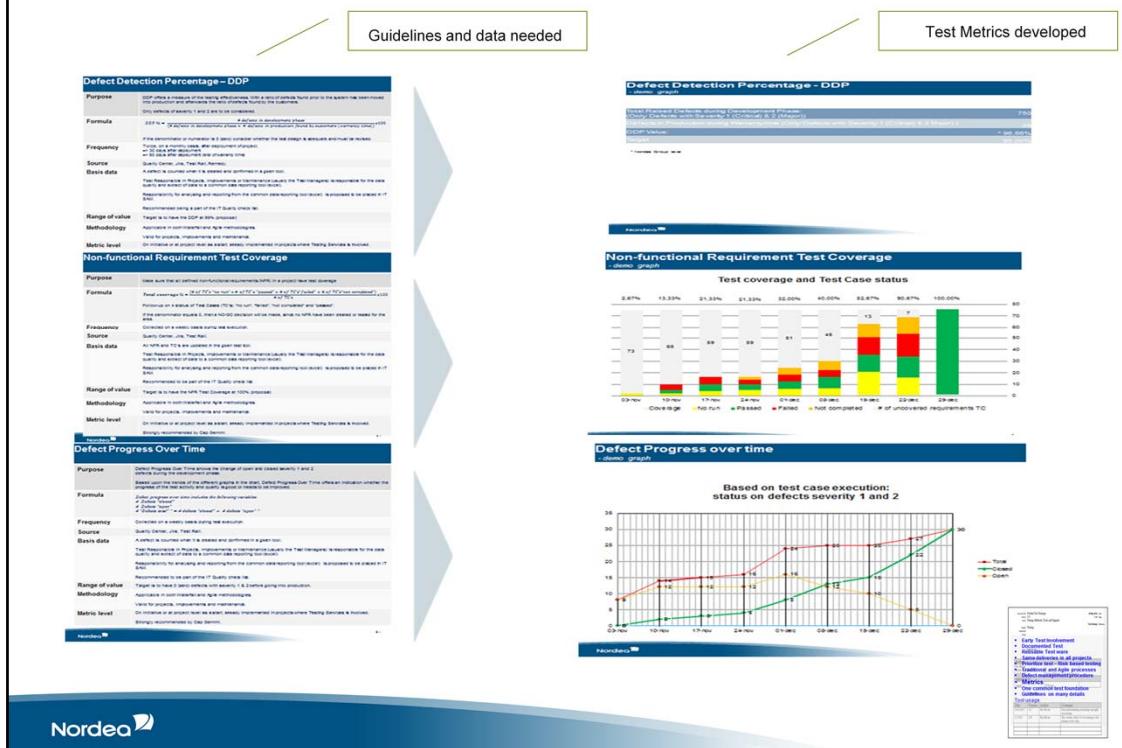
Nordea

Non-functional Requirement Test Coverage – to make sure that all defined non-functional requirements (NFR) have test coverage.

Defect Progress Over Time - offers an indication whether the progress of the test activity and quality is good or needs to be improved.

Defect Detection Percentage (DDP) - offers a measure of the testing effectiveness.

Test Metrics and extract service catalogue – mandatory (page 2/2)



Coverage

Non-functional Requirement Test Coverage – to make sure that all defined non-functional requirements (NFR) have test coverage.

Progress/Quality

Defect Progress Over Time - offers an indication whether the progress of the test activity and quality is good or needs to be improved.

Effectiveness

Defect Detection Percentage (DDP) - offers a measure of the testing effectiveness.



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Test Data - Nordea Test Policy and Test Strategy rules

- Test data is of good quality.
- Test data that originates from production is masked and desensitized.
- Relevant test data to perform both functional and non-functional testing is available

The kind of test data to be used for functional and non-functional tests is documented

Deviations from Nordea's test policy and test strategy (i.e. compliance) are documented and reported.

A No-Go recommendation is made if presence of severe compliance violation is identified.



A No-Go recommendation is made if presence of severe compliance violation is identified e.g. testing on production data that are not masked or desensitised. Correspondence shall be documented.

Test Data – responsibility areas

The Business IT area
is responsible

- to provide test data and
- the quality the of it

Test Data RACI

	Group IT Operations	Group IT Infrastructure	Business IT Area
1. Establish and maintain overview of test data • Mainframe • Teradata, Midrange and User Platforms as appl. Owners, BITA owns the test data	C	C	AR
2. Provision of test data including loading mask data, desensitizing data etc. • Mainframe • Teradata, Midrange and User Platforms BITA is supported by Infrastructure	C	C	AR

R = Responsible
A = Accountable
C = Consulted
I = Informed

The Test responsible

- defines requirements on needed Test data
- document plans for test data use
- document and reports on deviations from Nordea test policy and test strategy
- give recommendation regarding for Go / No-go decisions considering test data compliance

Test Environment - Nordea Test Policy and Test Strategy rules

- Testing take place in production like test environments.
- Test environments for both functional and non-functional testing are available.

The test environments to be used for functional and non-functional tests are documented.

Deviations from Nordea's test policy and test strategy (i.e. compliance) are documented and reported.

A No-Go recommendation is made if presence of severe compliance violation is identified.



A No-Go recommendation is made if presence of severe compliance violation is identified e.g. testing in environments that has an infrastructural set-up which differ from production environment in such way that there may be a risk for unpredictable result in production mode. Correspondence shall be documented.

Test Environment – responsibility areas

Test Environment RACI

The Business IT area & IT Infrastructure are responsible for test environments

	Group IT Operations	Group IT Infrastructure	Group IT IT SAM	Business IT Area
1. Test Environment Strategy	C	AR	C	C
2. Test Environment hardware, other Infrastructure and Tools. Teradata software not included	C	AR		C
3. Test Environment applications e.g. customer accounts, file transfer, payments etc.	C	C		AR
4. Establish and maintain overview of the test environments • Mainframe • Teradata, Midrange and User Platforms	C C	AR C		C AR
5. Support of the test environments • Mainframe • Teradata, Midrange and User Platforms	C C	AR C		C AR

R = Responsible
A = Accountable
C = Consulted
I = Informed

The Test responsible

- defines requirements on needed test environments
- document plans for the use of test environments
- document and reports on deviations from Nordea test policy and test strategy
- give recommendation Go / No-go decisions considering test environment compliance



Secure that review meetings with all relevant stakeholders from IT and Business IT Area (BITA) are held in order to secure that all test environments and relevant test data is set-up correctly according to the requirements (functional and non-functional).

Plan and execute meetings with BITA regarding use of test data and test environments.

Document the meeting decisions.

Document what test data is going to be used for functional and non-functional tests. Also document if any deviations from Nordea's Test Policy and Test Strategy (i.e. compliance) is known.

Test Data & Test Environment – Secure decisions

- Secure that review meetings with all relevant stakeholders from IT and BITA are held in in order to secure that all relevant test data is set-up correctly according to the requirements (functional and non-functional).
- **Follow up**
- Plan and execute meetings with BITA regarding use of test data and test environments.
- Document the meeting decisions.
- Document what test data is going to be used for functional and non-functional tests. Also document if any deviations from Nordea's Test Policy and Test Strategy (i.e. compliance) is known.





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Functional vs. Non-functional testing

Functional testing investigates **WHAT** the system does.

It answers questions about accuracy, suitability, interoperability and compliance, e.g.

- Is the customer registered correct?
- Is it possible to withdraw money from an account?
- Is the account balance correct?

Non-functional testing investigates **HOW** (well) the system does it.

It answers questions about usability, reliability, performance and supportability e.g.

- Is it stable?
- Is it easy to use?
- Is there enough capacity?
- Is it fast enough?
- Is it as good as the last build/version?
- Where are its limits and bottlenecks?
- How will it react in an emergency situation (like a server goes down)?

A way to classify requirements – and to help finding them

FURPS+ is a model (from Hewlett-Packard) to categorise software attributes. We use it as tool to help us identify the requirements - especially the non-functional ones - and when we organise the requirements in documents.

Functionality	- Features, Security
Usability	- Human factors, Usability standards, Navigation rules
Reliability	- Frequency/severity of failure, Recoverability, Availability
Performance	- Load, Stress, Scalability, Throughput, Response time, Capacity
Supportability	- Maintainability, Adaptability, Compatibility, Configurability, Scalability, Installability, Localizability, Portability
+ constraints	e.g. copy rights

Non-Functional

The URPS categories are generally architecturally significant and the "+" in the FURPS+ acronym is used to identify additional categories that generally represent constraints.



See technical test terminology, please see [ISTQB® Advanced Level Syllabus Technical Test Analyst](#)



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Test Tools

Test tools are needed in order ...

To deploy applications quickly and efficiently

- Test automation supports frequency of deliveries to production

To cope with the complexity of managing test from start to end e.g.

- To assure test covers all important requirements on the new solution
- To track of execution, identify problems easily
- To make it easier to adhere to the test process
- To make it easier to structure and re-structure test



Common test tools in Nordea

- HP Quality Center – test management
- JIRA together with the plug-in Zephyr - test management
- HP Quick Test Performance – QTP and Selenium - test automation
- SoapUI - test automation of services



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Test tools are needed in order to deploy high-quality applications quickly and efficiently, as managing test from start to end can be complex.

Using a test management tool can furthermore support an organization's test process, making it easier to implement and govern the process throughout the project.

Common test tools in Nordea

- Quality Center for managing the functional tests in projects.
- JIRA for bug tracking, issue tracking, and team/project management. Together with Zephyr
- HP Quick Test Performance – QTP and Selenium are used for Test Automation

Benefits of having common test tools

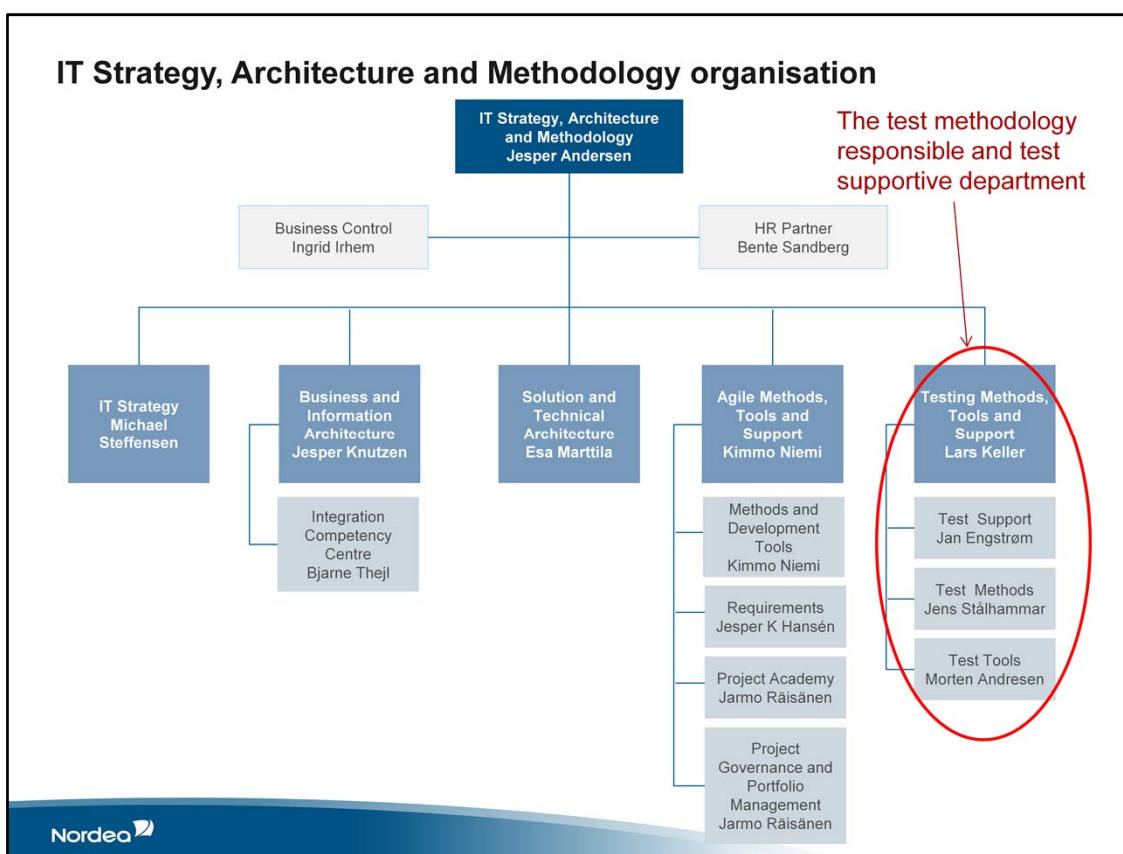
- When having a common project set up in the same tool, all stakeholders will easily recognize the deliveries from the test process, such as Test cases, Test reports and Defect reports.
- Stakeholders will be able to reuse knowledge and test documentation and project set up is much easier reducing the cost for support.
- Nordea will get the possibility to decrease their license costs when using one supplier.
- When having a common project set up in the same test tool, Nordea facilitates

reaching the same level of quality in different projects.



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IT Strategy, Architecture and Methodology organisation

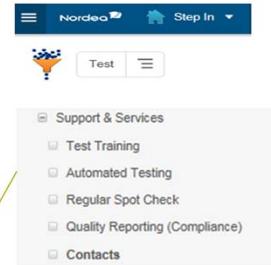


Test Support to get: see next slide

Support in Test

Testing Methods, Tools and Support (MTS) provides service in the following areas:

- Support on Test Method
- Support on Test Tools
- Support on Performance test
- Support on Test Automation



Examples

Test resource competence for assignments in e.g. projects

- test managers
- performance test experts
- test automation experts

Test resource competence for method coaching assistance

Ad-hoc assistance on test method

Answers on test questions through the 'Support' function available in Step-In – Test portal



E.g. see StepIn Test Portal – Contact page!

Test instructions are available in an easy way

The screenshot shows the Nordea Intranet homepage. At the top right, there's a search bar with placeholder text 'People' and a button labeled 'Søg'. Below the search bar, there are links for 'Hjælp', 'Sitemap', 'Telefobøger', 'Print', and 'Min profil'. A user profile icon is also present.

The main content area features several news cards and a sidebar with application links. One news card from 'Nordea' discusses a competition for distribution. Another from 'Nordea Danmark' mentions a challenge and a mother's day gift. A third from 'Din organisation' talks about competence lift for PMs and a management presentation.

The sidebar on the right lists various applications: Application Development Tools, Application Register, Buy & Pay, Clarity, E-travel, HR Self Services, IT butikken, IT planning and reporting tool, Password Self Service, PlanMill time registration, Remedy, SharePoint, Step In, and Test portal. A red arrow points from the text '.. accessible from Nordea Intranet start page' to the 'Test portal' link in the sidebar.

At the bottom left, there's a 'Vælg kanal' dropdown menu. The footer contains the Nordea logo.

**.. accessible from
Nordea Intranet
start page**

A channel through Widgets with addition of a test portal application that make it visible on the front page of the intranet for the relevant user to communicate, coach and mentor, how to use the new testing initiatives

Step-In

Welcome to **Step In**, the Nordea site for methods and tools supporting the application lifecycle.

Here you find e.g. project management, process modelling and system development.

Step In is meant to be an interactive site where we can build knowledge together.

... where you will find the Test portal and other knowledge areas in the software development process

Welcome to **Step In**, the Nordea site for methods and tools supporting the application lifecycle.

Here you find e.g. project management, process modelling and system development.

Step In is meant to be an interactive site where we can build knowledge together.

All methods, processes and templates etc. related to Test is to be found at this site.

Test Portal

The screenshot shows a web-based test portal interface. At the top, there's a navigation bar with links like 'Nordex', 'Step In', 'Knowledge areas', 'Tools', 'Community', 'Teams', 'Projects', and a search bar. Below the navigation is a header with a logo, a 'Test' button, and a 'Create' button. The main content area has a title 'Test' and a subtitle 'Created by Ory Hege Jansen, last modified by Linda Lindman on Aug 26, 2015'. A section titled 'Testing is not the last thing we do!' contains text about testing strategy and methodology. On the right side of the page, there's a 'Support' window with a red arrow pointing to it from the text above. The support window contains a link to 'Test Methods And Test Tools'. Below the support window, there's a yellow box containing an e-mail address: 'TestMethodsAndTestTools@nordea.com'. Another red arrow points down to a yellow box containing a JIRA issue link: 'Testing Methods Tools and Support (TT)'.

... You can reach test support from all pages in the Test portal:

An e-mail to
Test Methods And Test Tools
(TestMethodsAndTestTools@nordea.com)

A JIRA Issue in project
Testing Methods Tools and Support (TT)

The Test Portal in Step-in.

All pages have a 'Support' window which contains a link that activates an e-mail function (Outlook) where you are welcome to ask all kind of questions regarding test. The e-mail ends-up in the JIRA application as an issue and someone in *Testing Methods Tools and Support* is assigned to take care of your question.

You will receive answer etc. as e-mails from JIRA and you can reply to them (all conversations are stored in JIRA).

Of course, you can also go into the JIRA application and make the comments there. (JIRA as an application is accessible from Intra start page in the same manner as the Test portal.)



*Making it
possible*

Nordea

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