



# Does Low Code mean Low Testing?

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Software testing

Business Process Transformation

Security testing

## Who is Jan Jaap Cannegieter?

SQUERIST 

Principal Consultant

Testing  
Requirements  
Agile Transformation



## Agenda

- > What, how and why of Low Code
- > Do we have to test Low Code applications?
- > Low Code applications Risk Profile
- > Example projects

System development has evolved,  
so we have to evolve as well!



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## What, how and why of Low Code

Software testing

Business Process Transformation

Security testing

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## Definition

- > Forrester: Products and/or cloud services for application development that employ visual, declarative techniques instead of programming
- > Mendix: Low code is a visual approach to software development. Low code abstracts and automates every step of the application lifecycle to enable rapid delivery of a variety of software solutions. It breaks the traditional silos of business and IT to promote continuous collaboration.

‘Building applications not by coding but by drag, drop and set properties’



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## ‘High Code’ versus Low Code

From:

```
function CreateConfigWithDynamicProperties() {
  this.createConfig = function (options) {
    var config = {};

    if (options["executable"] || options["dir"]) {
      config.app = { fileName: options["executable"], workingDirectory: options["dir"] }
    }

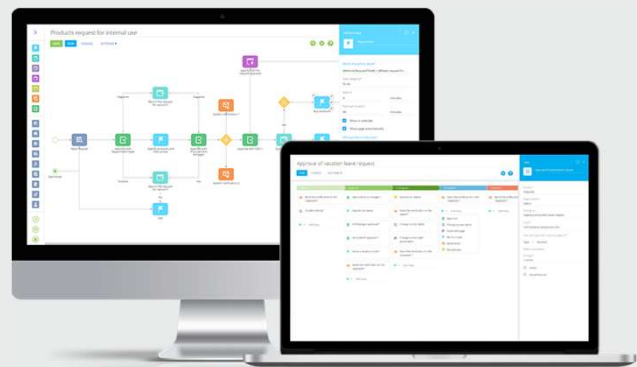
    if (options["ip"] || options["proto"]) {
      config.network = { ip: options["ip"], protocol: options["proto"] };
    }

    return config;
  }

  var applicationConfig = this.createConfig({ executable: 'app.exe', dir: 'c:/development/current' });
  // result: [{"app":{"fileName":"app.exe","workingDirectory":"c:/development/current"}}]

  var applicationConfigWithNetwork = this.createConfig({ executable: 'app.exe', ip: '127.0.0.1' });
  // result: [{"app":{"fileName":"app.exe"},"network":{"ip":"127.0.0.1"}}]
}
```

To:



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## 'Low Code development' @ Disney



Upcoming footage is only for information and entertainment purposes, not professional purposes

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**ROBIN HOOD**



**SNOW WHITE**

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WINNIE THE POOH



THE JUNGLE BOOK

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Reuse of drawings,  
scenes and techniques

Saves time and money



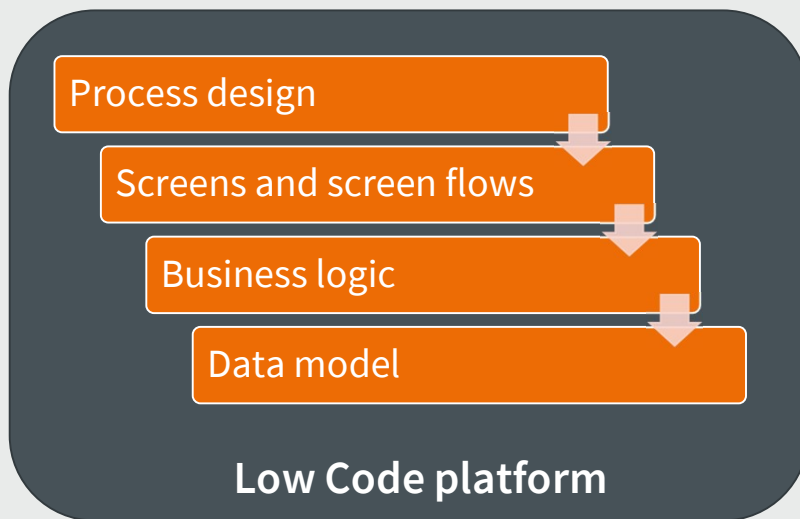
Flexible

Importance of good  
storage

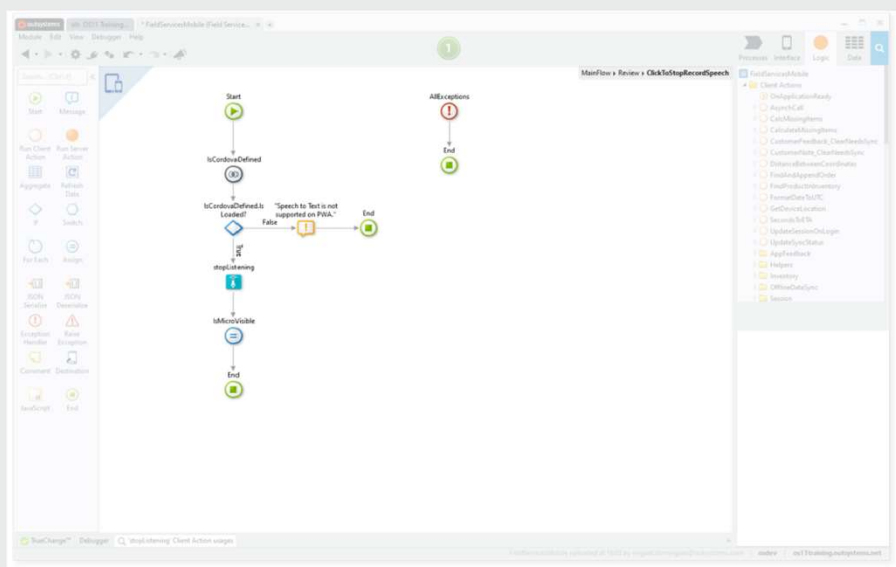
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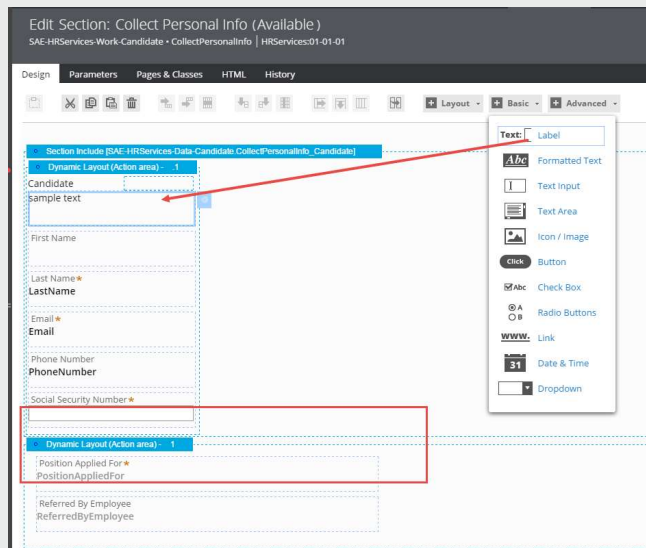
## Four-layer model Low Code platforms



## Example process design: Outsystems



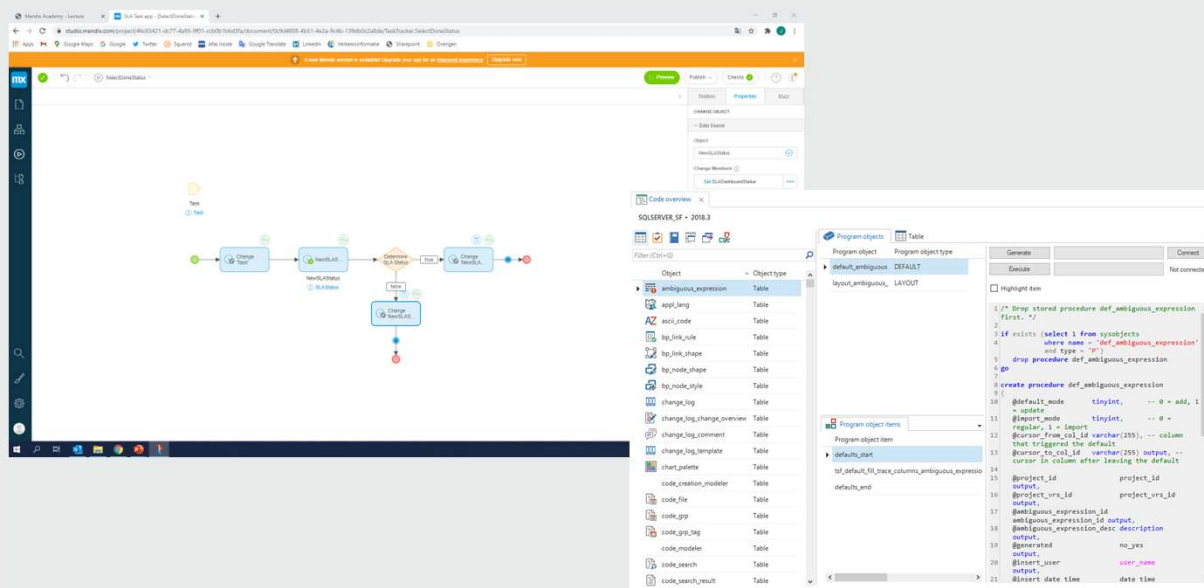
# Example User Interface design: Pega



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# Example Business Logic: Mendix

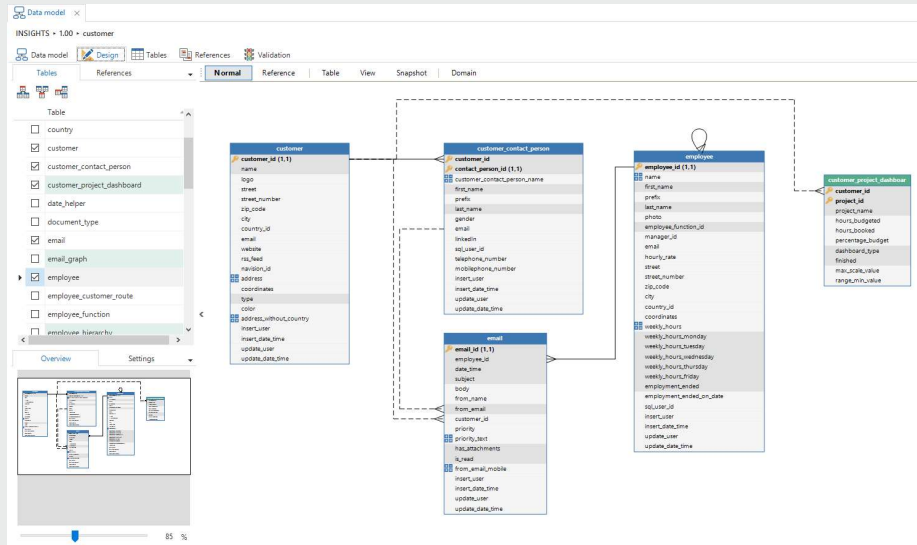


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## Example Database: Thinkwise



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## Reasons for organizations to apply Low Code



- > Time to Market
- > Cheaper development
- > More easily tailored core systems
- > Extendable architecture
- > (It is the new kid on the block)

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Figure 1. Magic Quadrant for Enterprise Low-Code Application Platforms



**Do we have to test Low Code applications?**

## Development of use of low code

- > Generation 1: Experimenting, making small, stand-alone apps
- > Generation 2: Making 'on top' apps
- > Generation 3: Making serious 'on top' apps, replacement of custom build functionality and complete applications
- > Generation 4: Making large scale, complex, business critical, highly reliable and secure/compliant core applications



**Fake news!**

We think Boeing doesn't want this to happen!

Maintenance Boeing airplanes stopped due to software f...  
Last update: October 12th 2022

59.000 Volvo's teruggedroepen om softwarefout

Microsoft: accuproblemen Surface Pro 3 zijn softwarefout - update

Beigische pinautomaten onbruikbaar na fout software

Softwarefout veroorz...  
Airbus'

Fout software

Softwarefout Cloudflare zet deur open na...

## Increasing risk

- > Large scale: many stakeholders affected
- > Complex: easy to make mistakes and some mistakes are not easy to discover in production
- > Highly reliable: the core processes depend on it
- > Secure/compliant: I hope I don't have to explain this category
- > You build the wrong thing



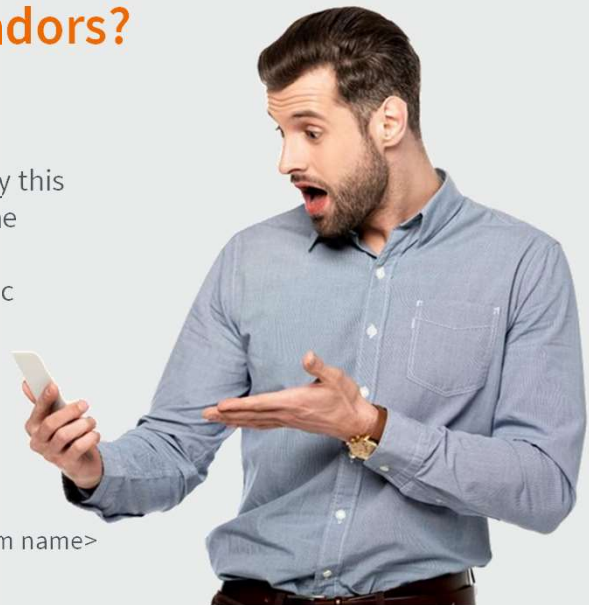
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## Is Low Code not tested by vendors?

Yes and no

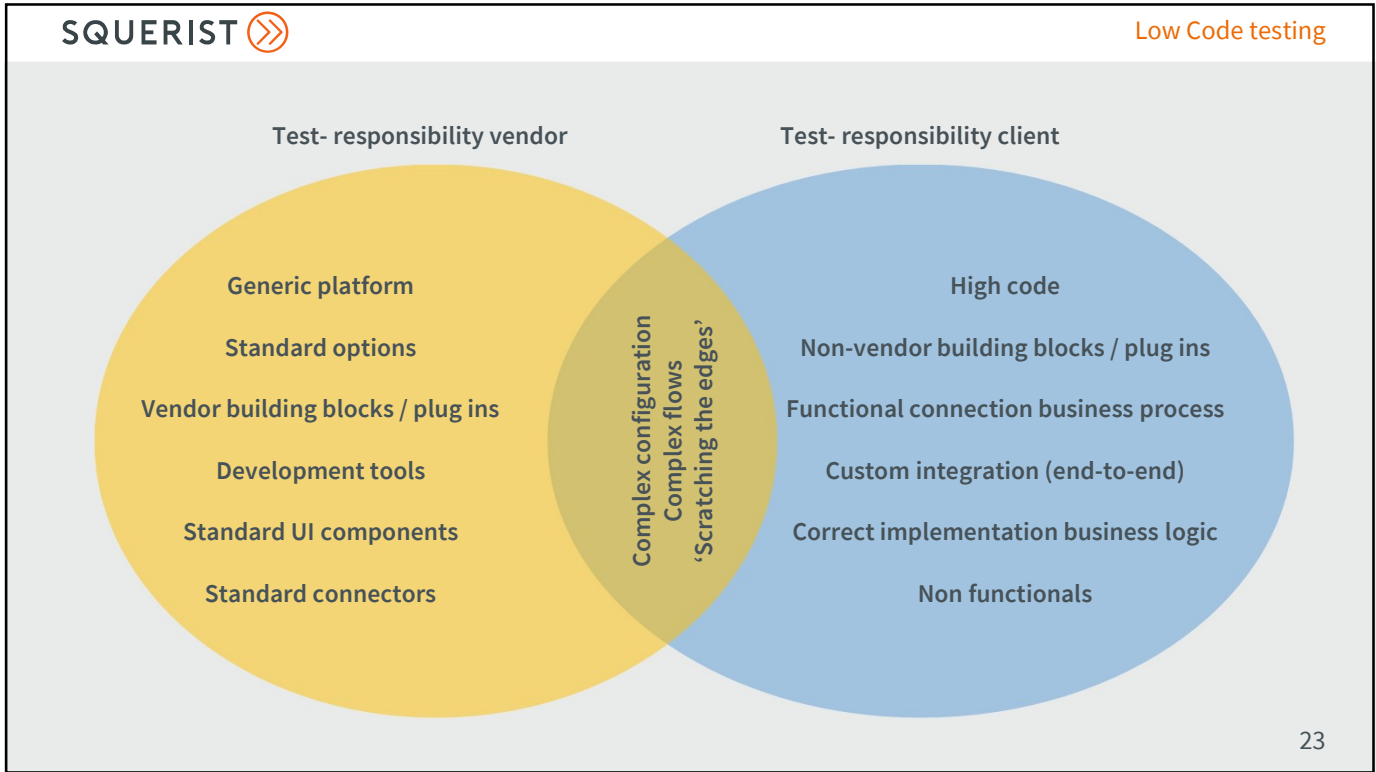
- > Yes: systems build by mature platforms using only this platform and the building blocks developed by the vendor have, generally speaking, higher quality compared to high code. And some have automatic validation.
- > No:
  - > Not all platforms are really reliable
  - > Building blocks can come from different sources
  - > In a lot of cases we have to incorporate high code
  - > 'There are a lot of ways to build a screen in <platform name> and only a few are good'
  - > The automatic validation is only on technical quality



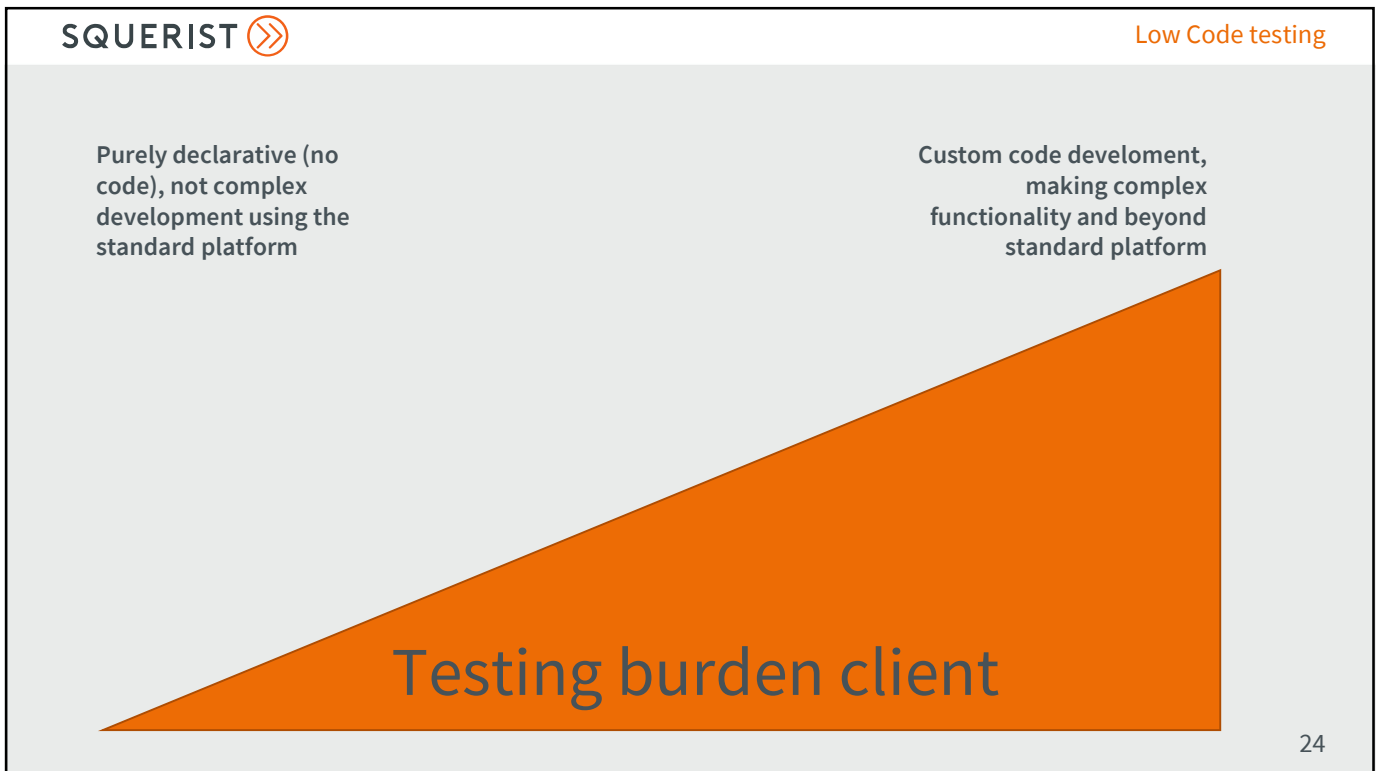
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## So, if you don't want to test

- > Make simple applications (the apps on top of for instance SAP)
- > Use only the standard platform and platform vendor building blocks and plug ins
- > Avoid custom coding
- > Make applications for small amount of users
- > And make sure there is a workaround in case of errors



## Or accept the risk!

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It is up to you whether you test your low code application.

But in case you don't I hope I'm not a client of your organization or work for your organization



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## Low Code risk profile

Software testing

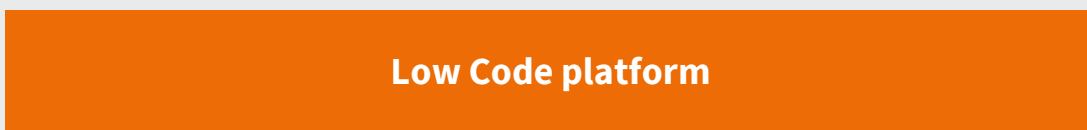
Business Process Transformation

Security testing

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## How standard is your application



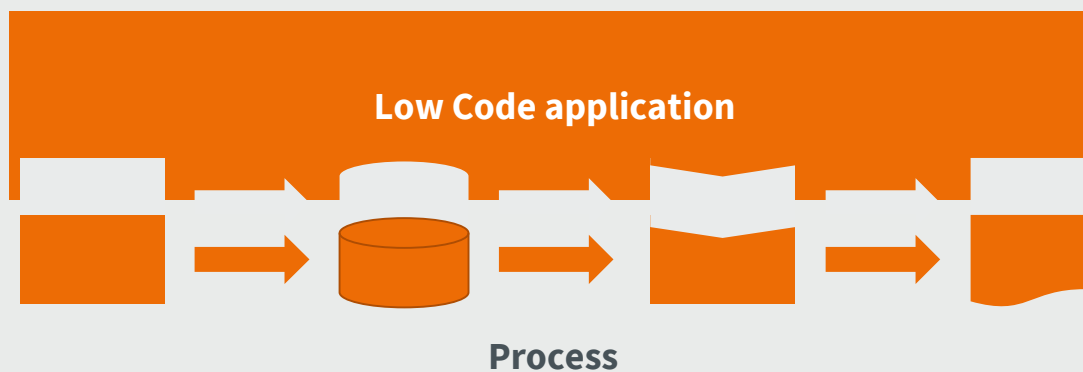
Process

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## How standard is your application

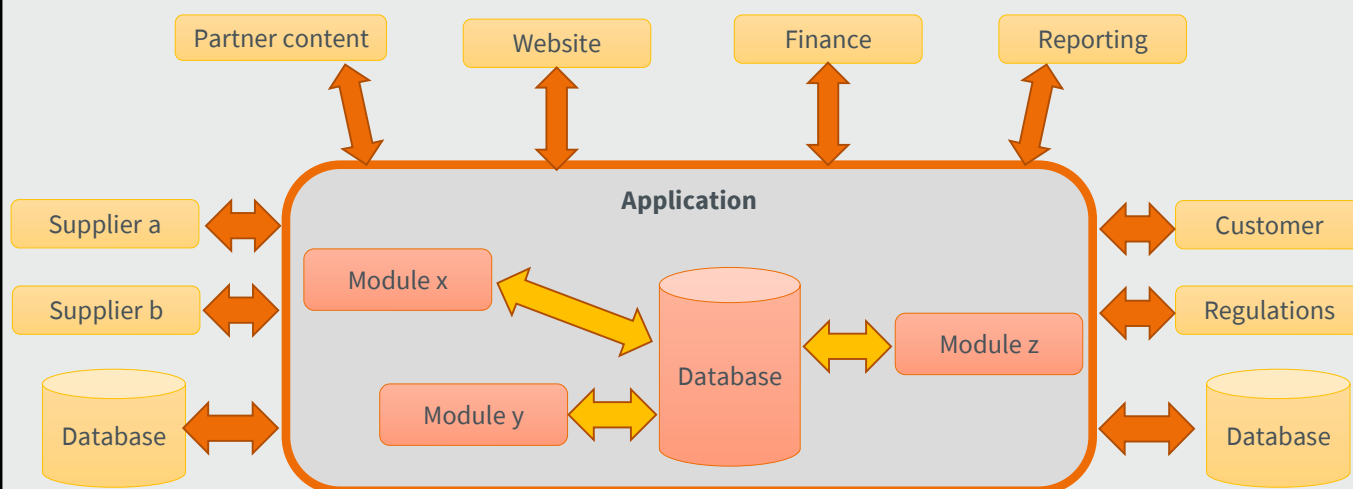


Your implementation is unique!

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## Low Code applications are not on an island



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## What to test on a Low Code application


**Application**

Processes / presentation	➔	Do test	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="background-color: #f4a460; padding: 5px; margin-bottom: 5px;">Internal system</div> <div style="background-color: #f4a460; border-radius: 50%; padding: 5px; margin-bottom: 5px;">Database</div> <div style="background-color: #f4a460; padding: 5px; margin-bottom: 5px;">Dashboard/ rapporting</div> <div style="background-color: #f4a460; padding: 5px;">External system</div> </div> <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-weight: bold;">End to end testing</p>
Business rules	➔	Do test	
Standard functionality	➔	Don't test, unless you make modifications	
Data (migration)	➔	Do test	


Non functionals  
(performance, security, privacy, usability et cetera)

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## New, Low Code related risk



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# Citizen developer or non professional developer

You can build systems much, much faster.  
And you can build bugs, inconsistency's, functional defects  
and other rubbish much, much, much faster

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We still need system development  
skills in Low Code development



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## What to test on a Low Code application

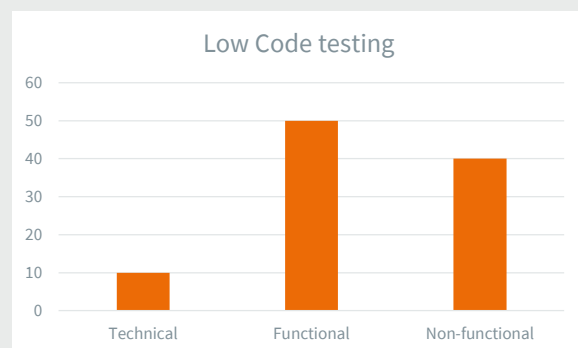
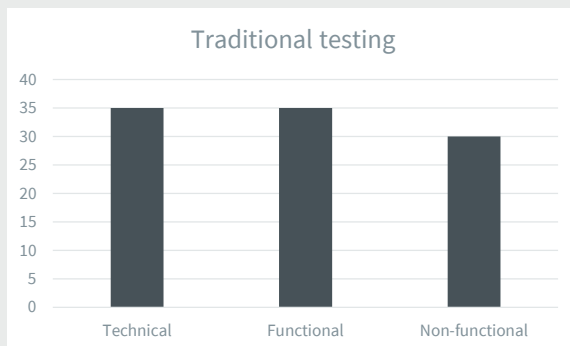
- > Processes and daily use
- > Correct implementation business rules
- > Data quality management
- > Integration with other applications
- > End-to-end testing
- > Non functionals
  - > Performance
  - > Security
  - > Privacy
  - > Usability



Add the test competence to your team; the quality mindset

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## Relative effort in testing



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## Examples

Software testing

Business Process Transformation

Security testing

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## Examples Low Code testing



Establish of the test process and implement testing in a big, business-critical project (Thinkwise)



Prepare and execute performance testing of the students portal and organize different product risk analyses (Mendix)



Testing a ERP system for a car parts trading organization build in OutSystems.

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