EXPECTATIONS MATTER.

WE'RE COMMITTED TO EXCEED YOURS

COMBINING THE STRENGTHS OF USER EXPERIENCE DESIGN AND MODEL BASED TESTING

Amersfoort 20 November 2014

NSPYRE

CHALLENGES IN SOFTWARE DEVELOPMENT

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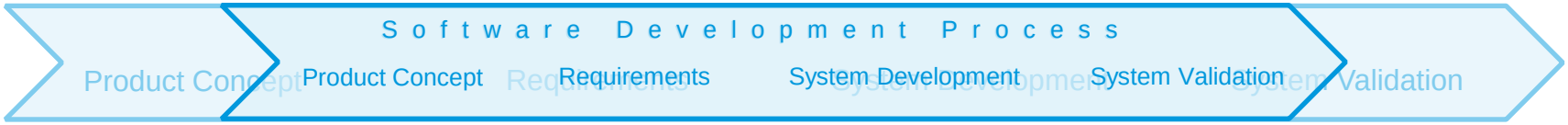
- General: Pressure for shorter development times



- From Testing perspective
  - Testers come in at end of project
    limited time to build full understanding of system, requirements, usage scenarios

- From User Experience perspective
  - UX most involved in beginning of project
    actual implementation impacts user experience e.g. performance, exception handling, visual details, …

SYNERGY BETWEEN UX DESIGNERS AND SYSTEM TESTERS

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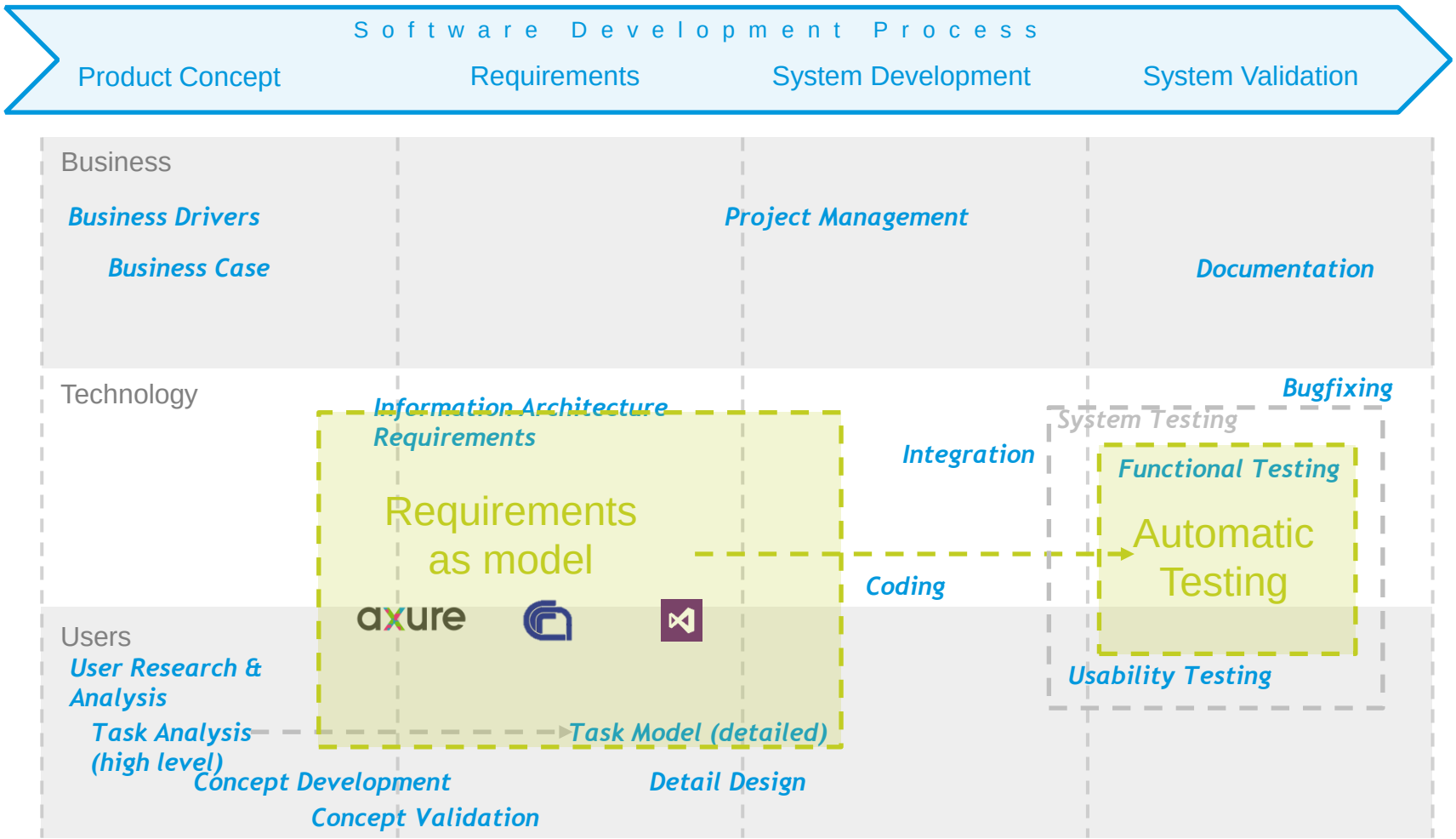

AGENDA

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- User Experience and Task Models

By Anita Wierda

- Model Based Testing and UIspec tool

By Rachid Kherrazi

- From Task model to Test Model using UIspec tool
- Case study and results
- Demo (during coffee break)

By Neda Noorozi

Also involved in this project Arjan van der Meer

TEST PROCESS

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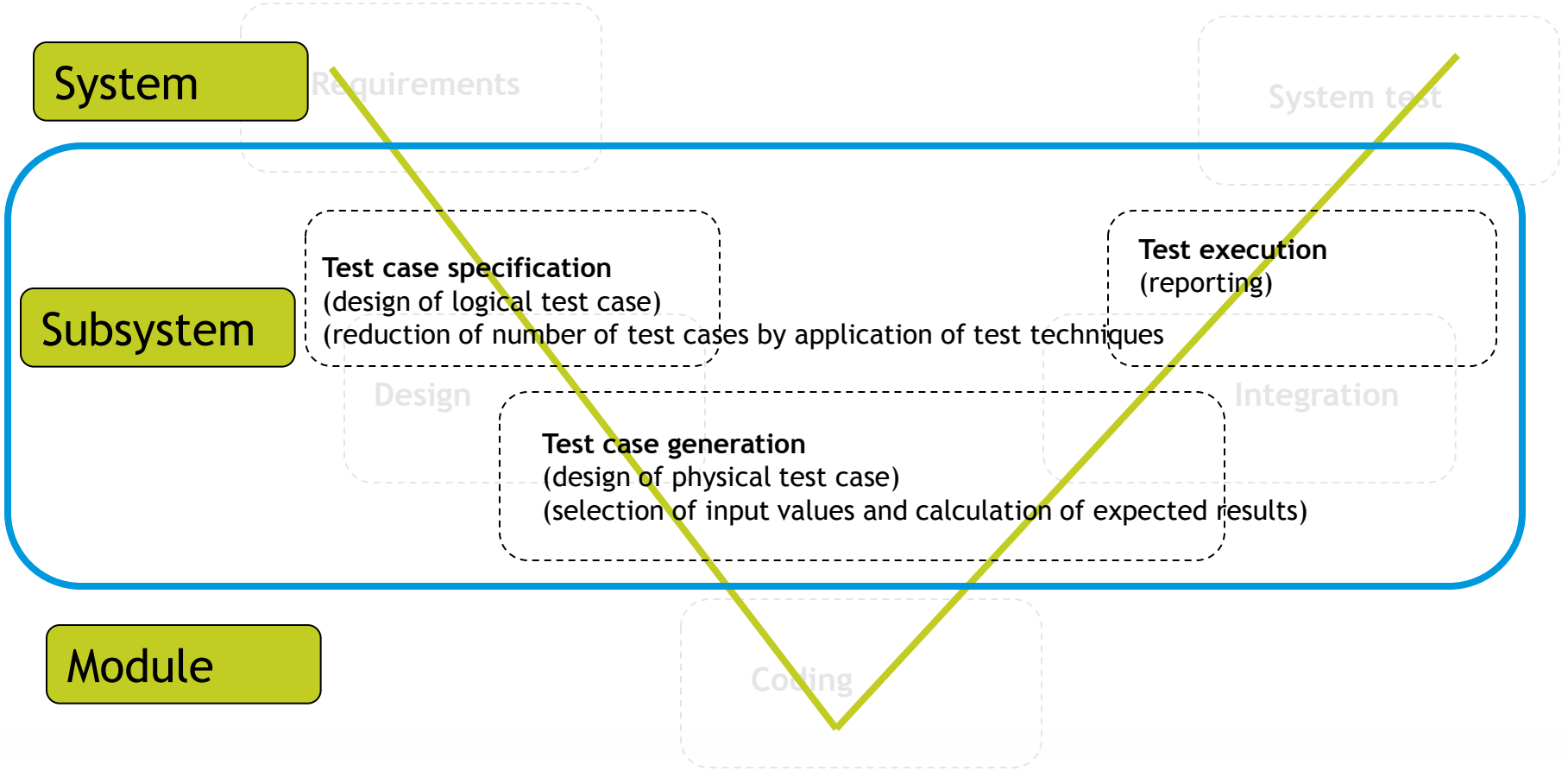
3 main steps in test process



MBT IS THE AUTOMATION OF TEST CASE GENERATION

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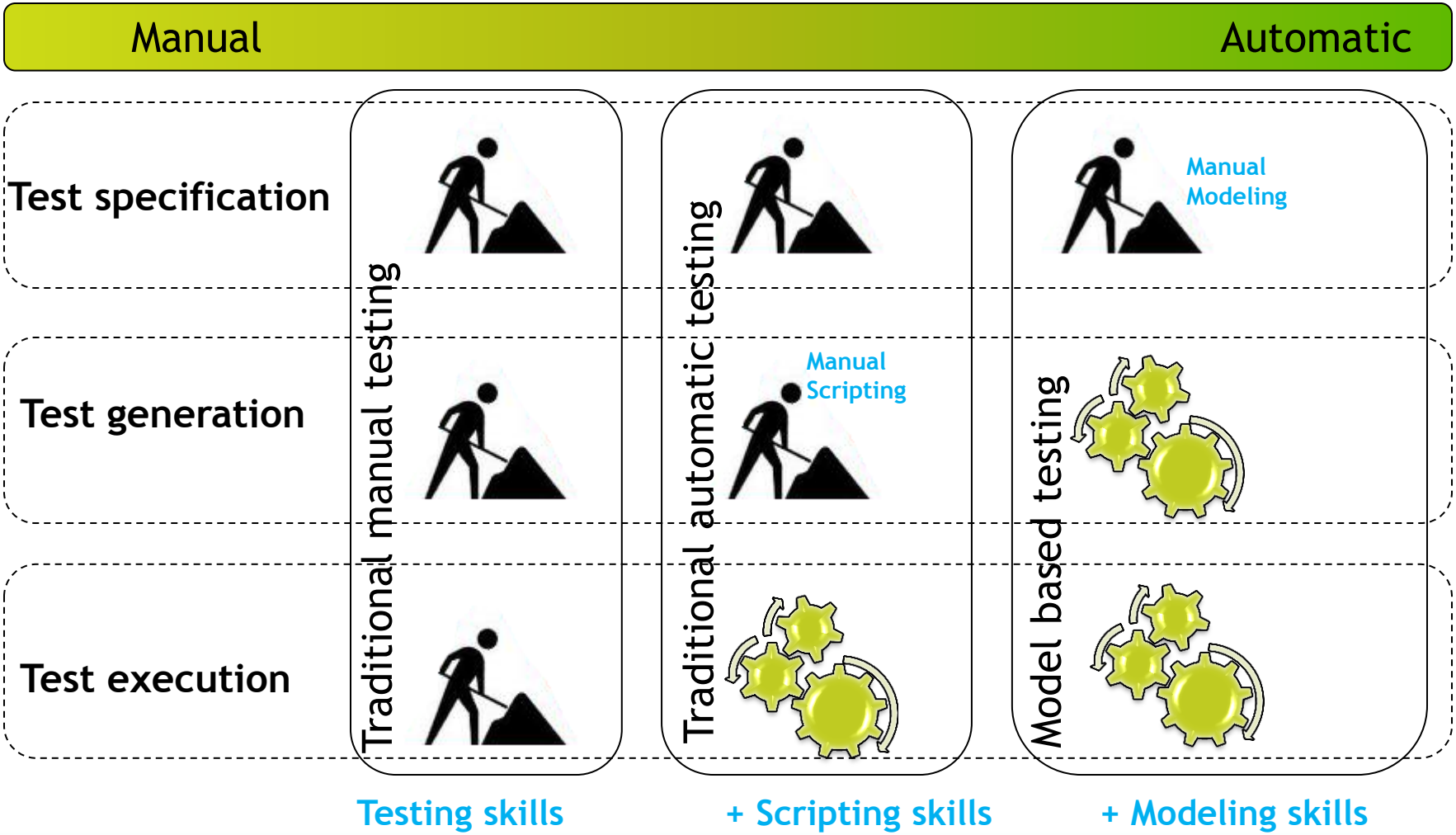

WHY ARE MODELS NEEDED FOR TESTING?

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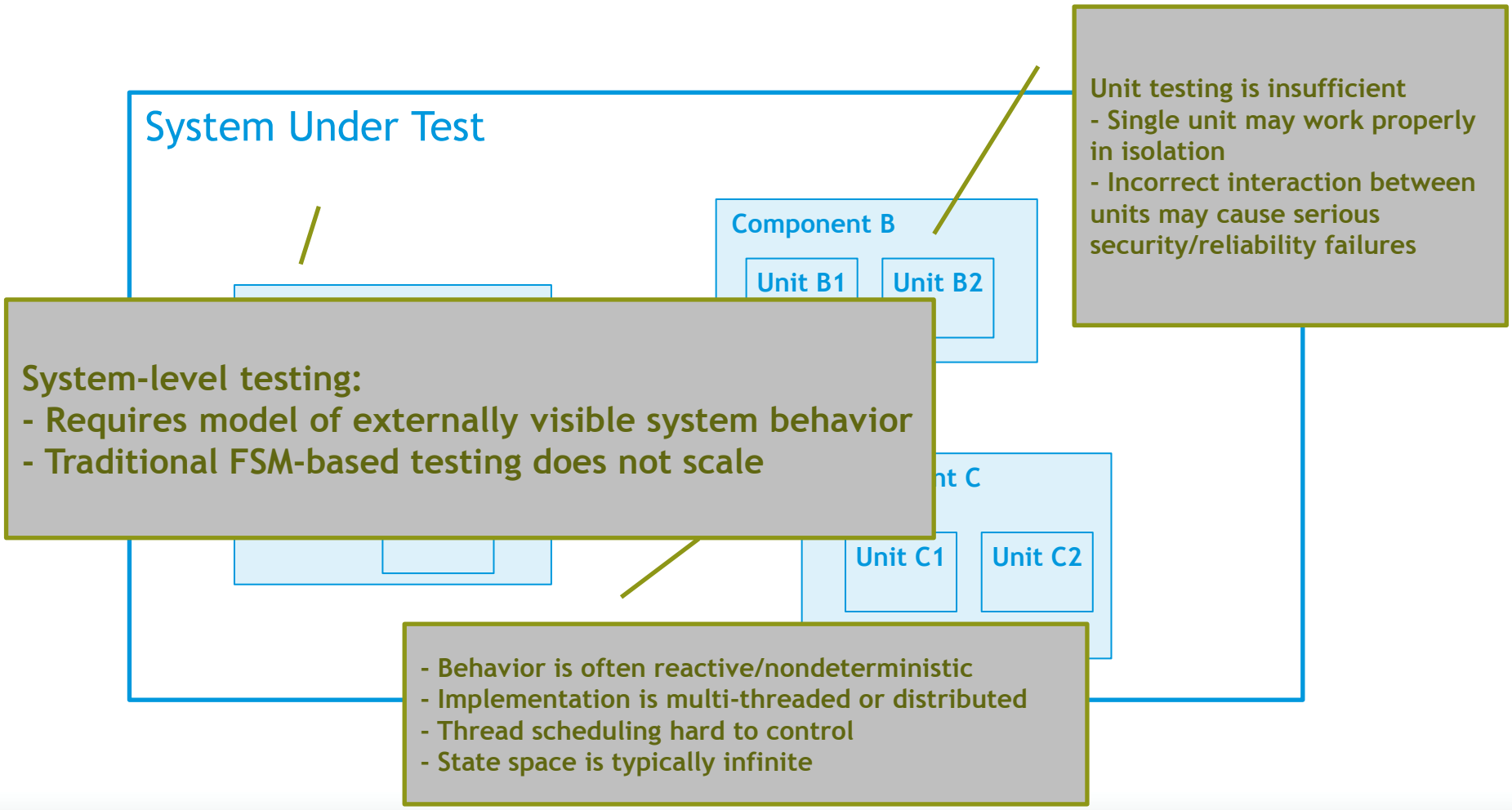

SOME BENEFITS OF MODEL BASED

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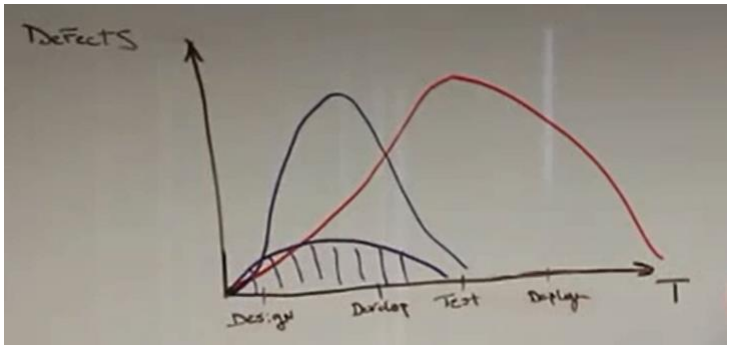
- Increased productivity (increased automation)
- Better test script maintenance
- Improved product reliability (early defect detection)
- Agility (Easily react to new feature changes, Reusability of test semantics, Early test engagement, Drive quality upstream)
- Increased employee satisfaction (challenging, new horizon, fun)



MBT:
CHALLENGES AND OPPORTUNITIES

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Challenges:

MBT is not easy: Different mind shift from traditional testing (**Modeling skills**) and steep learning curve and high ramp up cost (tooling)

Opportunities:

Modeling skills: specialized training and certification

➔ e.g. iSQI Certified MBT training (CMBT)

➔ Nspyre is a iSQI training provider

Tooling: More robust (Open Source) tools supporting integration of modeling, M2M transformation,…

➔ e.g. Nspyre UIspec

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SUPPORTING TOOLING

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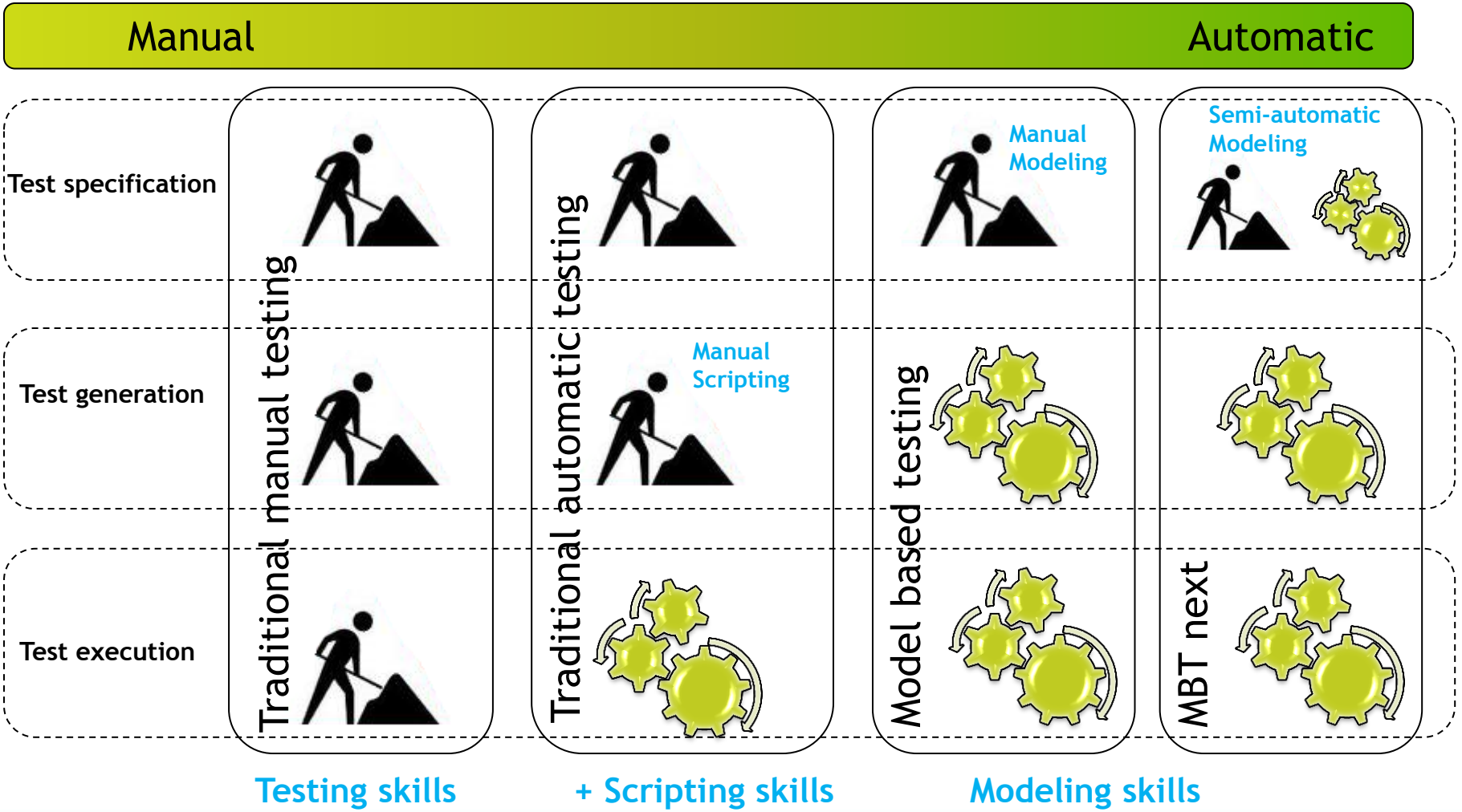

IDEA: REUSE EXISTING MODELS

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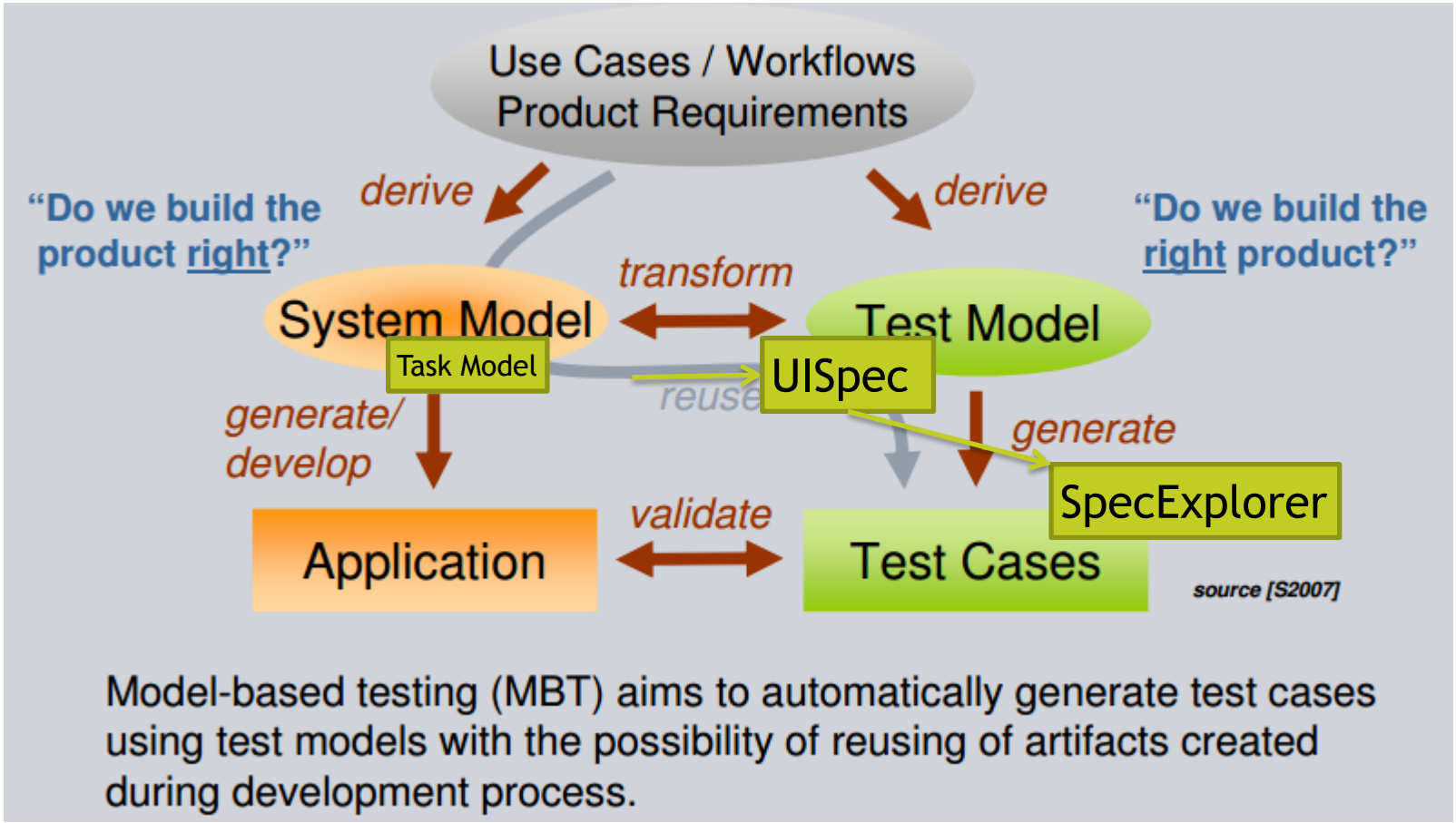

Model-based testing (MBT) aims to automatically generate test cases using test models with the possibility of reusing of artifacts created during development process.

MBT: WORKFLOW

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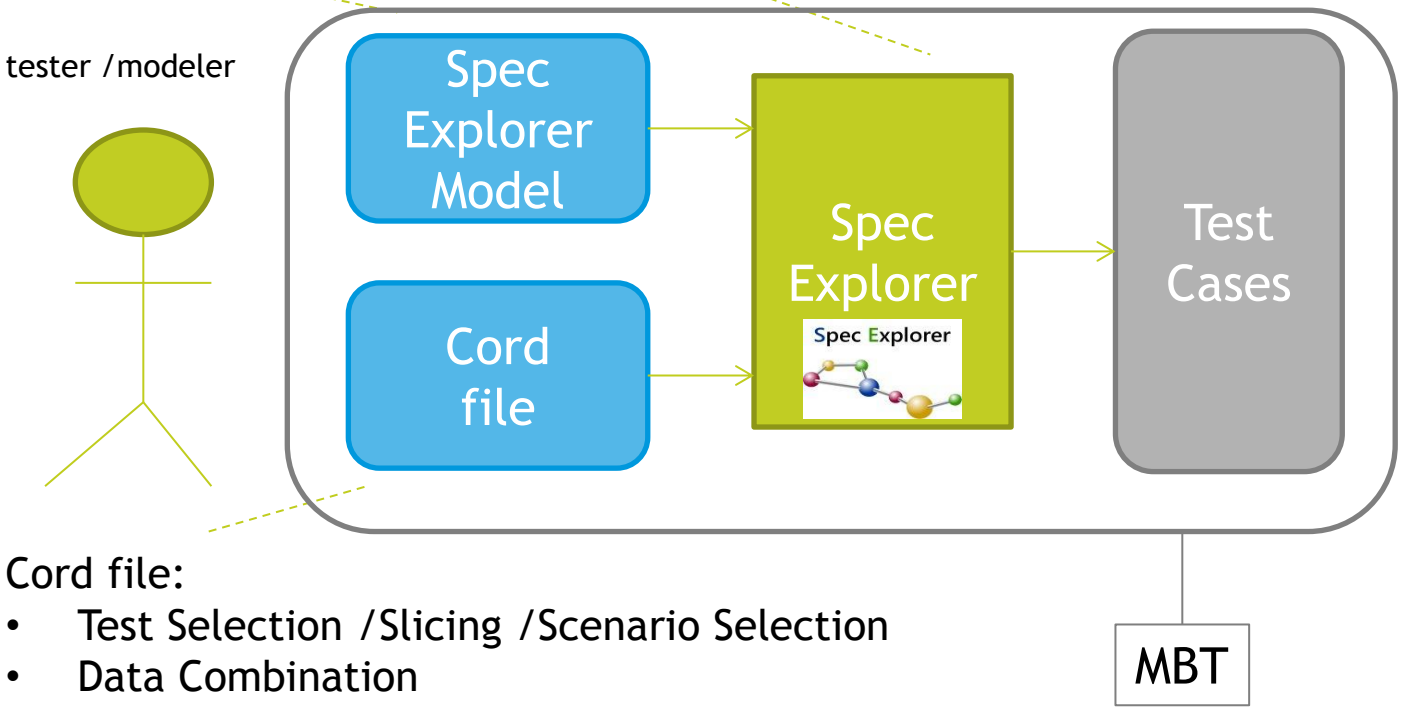
Model:
- Interface behavior

Spec Explorer (MBT tool):
- Generate automatically test cases



Cord file:
- Test Selection /Slicing /Scenario Selection
- Data Combination
- Model Composition

UISPEC: WORKFLOW

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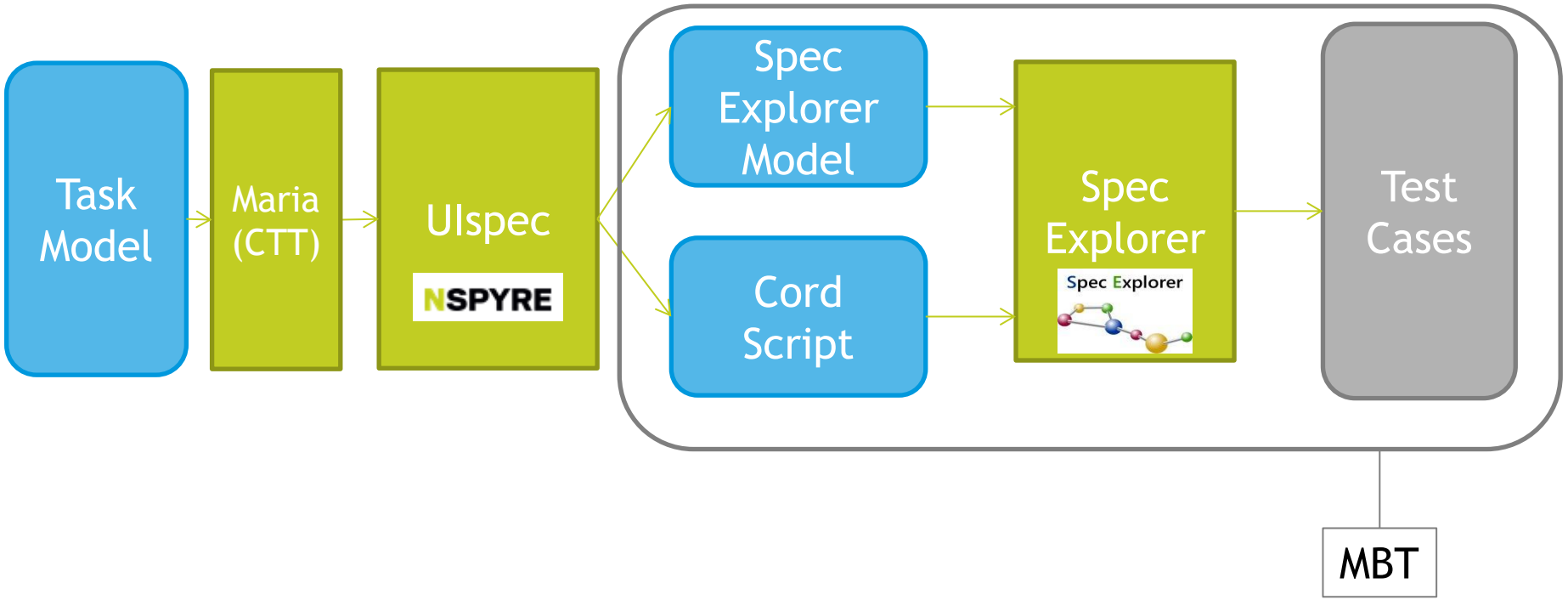
Reuse existing UI Task models to generate Spec Explorer MBT models automatically



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By Rachid Kherrazi Project leader

- **From Task model to Test Model using UIspec tool**
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By Neda Noorozi MBT specialist at nspyre

Also involved in this project Arjan van der Meer MDE specialist

SAY HELLO APPLICATION DESCRIPTION

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User Action	System result
Start application	Show startscreen
Press “Say Hello” button	Fill in “Hello Best Testers” in textbox
Press “Clear” button	Clear content of textbox
Press X to exit application	Close application

SAY HELLO
CONCUR TASK TREE

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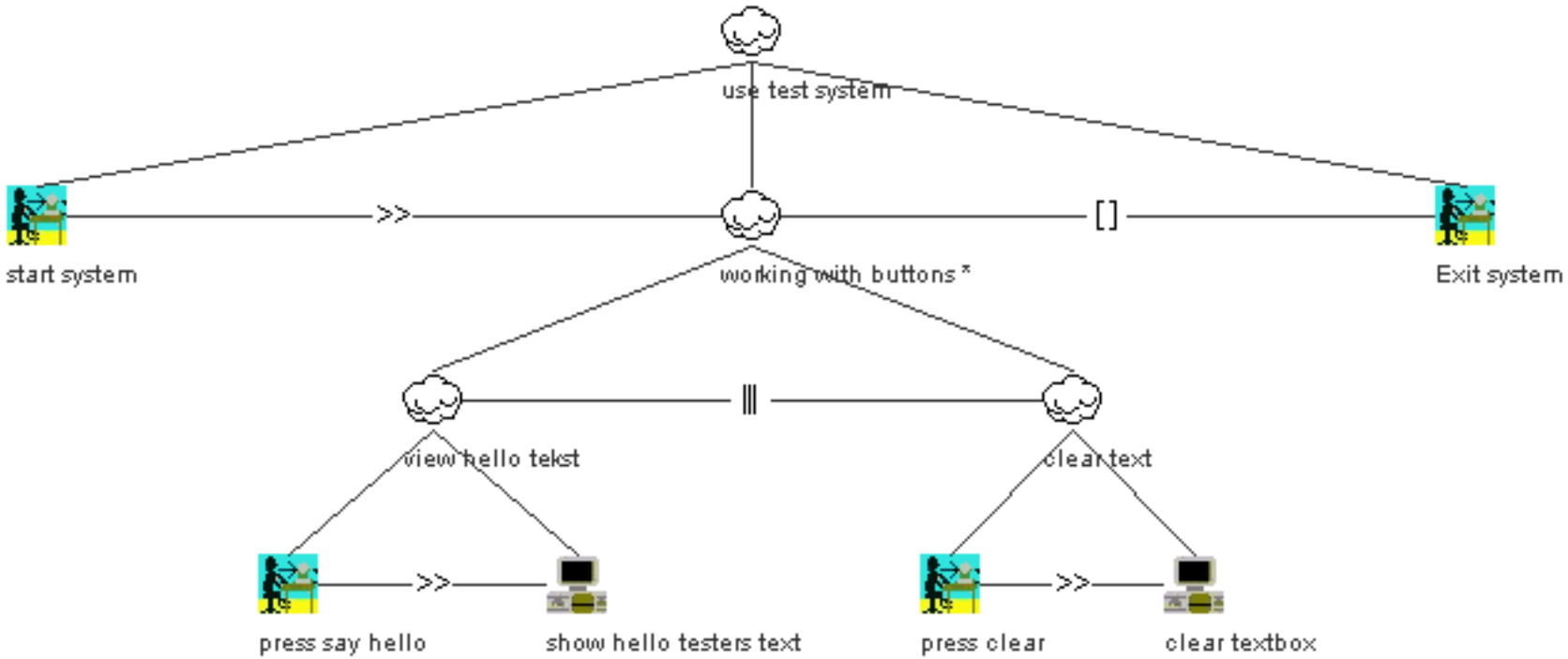

SAY HELLO FUNCTIONAL STATE MODEL

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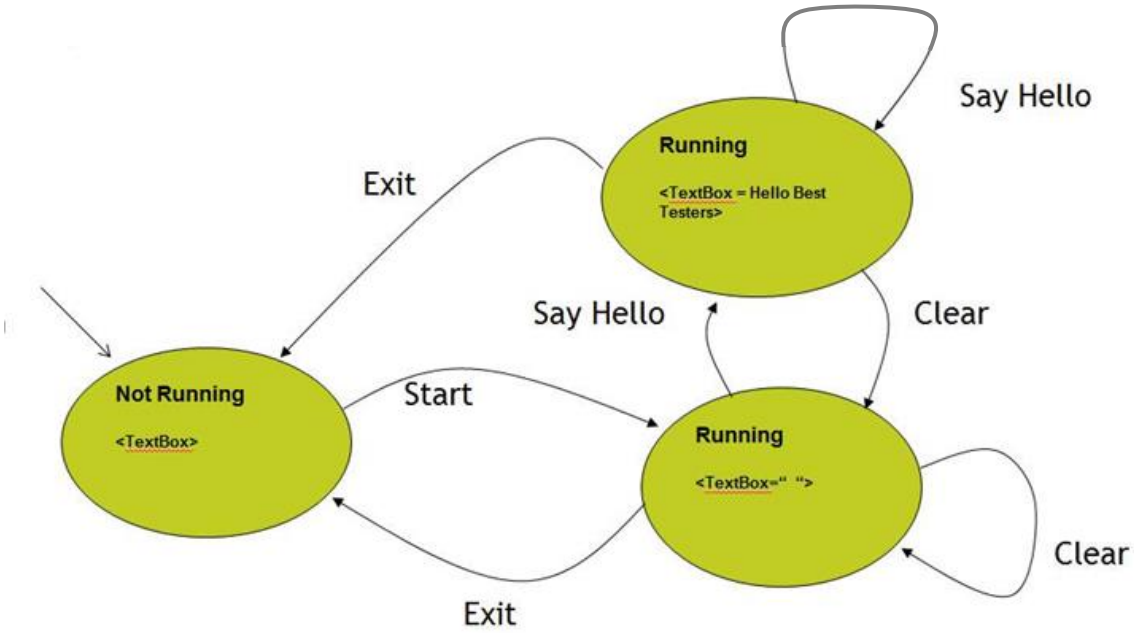
- Simple application but already many test scenarios



BENEFITS OF (CTT) TASK MODELING

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- Translation of design to Concur Task Tree seems straight forward
- Clear visual way of specifying all interaction details (e.g. all input fields in a screen) and user interaction flows -> can this replace use cases?
- Changes in requirements: Only keep this model up to date, not have to change all design mockups
- Model can be maintained by others than UX (free tooling)
- Model can be used for model driven engineering??

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CASE STUDY:
CAR RESERVRAION SYSTEM

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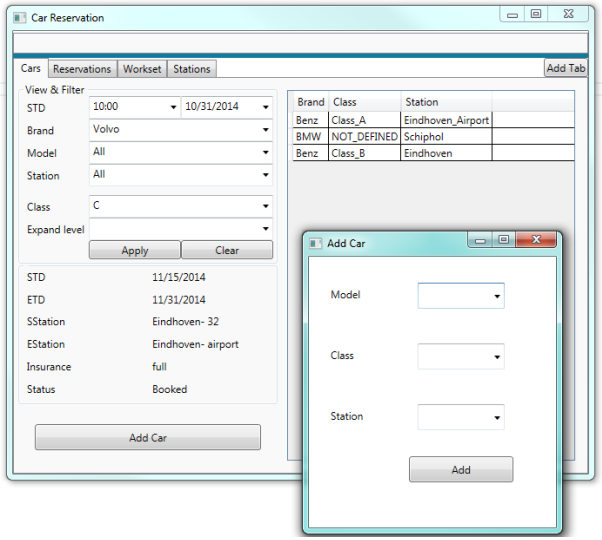
(2 requirements)



- Navigate to Cars tab

- Add a car to reservation system
  - select ‘add Car’
  - Enter Car info in the popup window
    - Enter ***mandatory*** information (fields)
      - Select Car *Model*
      - Select a *Station*

      (Req. 1)
    - Enter additional information, if applicable (Class of Car)

  - Select ‘Ok’ to close the window and perform the action *only if “Eindhoven” station is selected*

    (Req. 2)
  - Select ‘Cancel’ to close the window without performing the action

MANUAL TEST DESIGN AND SCRIPTING DECISION TABLE

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Input Conditions						
Car Model	-	X	-	X	X	X
Station	-	-	Y	$Y_{!=}$ Eindhoven	$Y_{=}$ Eindhoven	Y
Confirmation	OK	OK	OK	OK	OK	Cancel
Output Conditions						
Car is added	F	F	F	F	T	F
Test case Tag	A	B	C	D	E	F

Test Case D

- Select Tab By name ("tab_Cars_Mng")
- Click on Button by name ("btn_add_car")
- Wait for Window by name ("win_add_car")
- Select Item of ComboBox by name ("cmbox_model") with value ("BMW")
- Select Item of ComboBox by name ("cmbox_station") with value ("Eindhoven")
- Click on Button by name ("btn_Ok")
- Check Existence of Row with (Model: BMW, Station: Eindhoven)

Test Case E

- Select Tab By name ("tab_Cars_Mng")
- Click on Button by name ("btn_add_car")
- Wait for Window by name ("win_add_car")
- Select Item of ComboBox by name ("cmbox_model") with value ("BMW")
- Select Item of ComboBox by name ("cmbox_station") with value ("Eindhoven")
- Click on Button by name ("btn_Cancle")
- Check Non-Existence of Row with (Model: BMW, Station: Eindhoven)

Manual scripting challenges:

- **Different order in entering information -> manually design**
- **Data Selection -> manually done**
- **New fields -> destroy previous test cases**
- **Renaming some fields -> destroy previous test cases**

MBT + UISPEC: TASK MODEL

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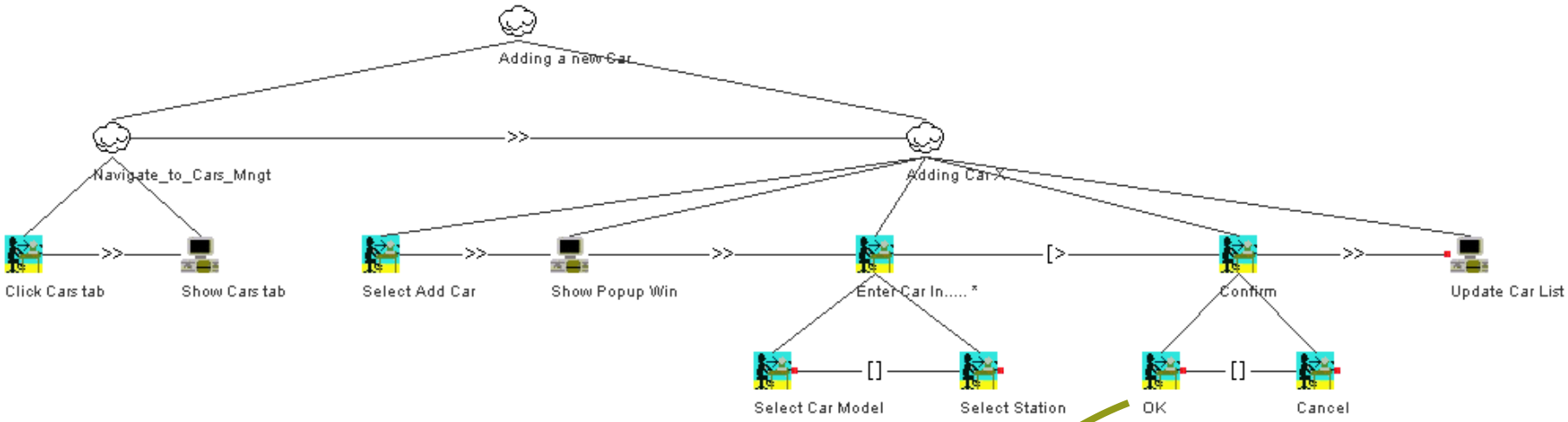

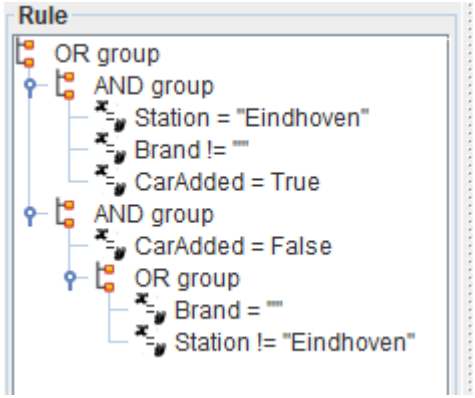

Postcondition

MBT + UISPEC: GENERATED MODEL

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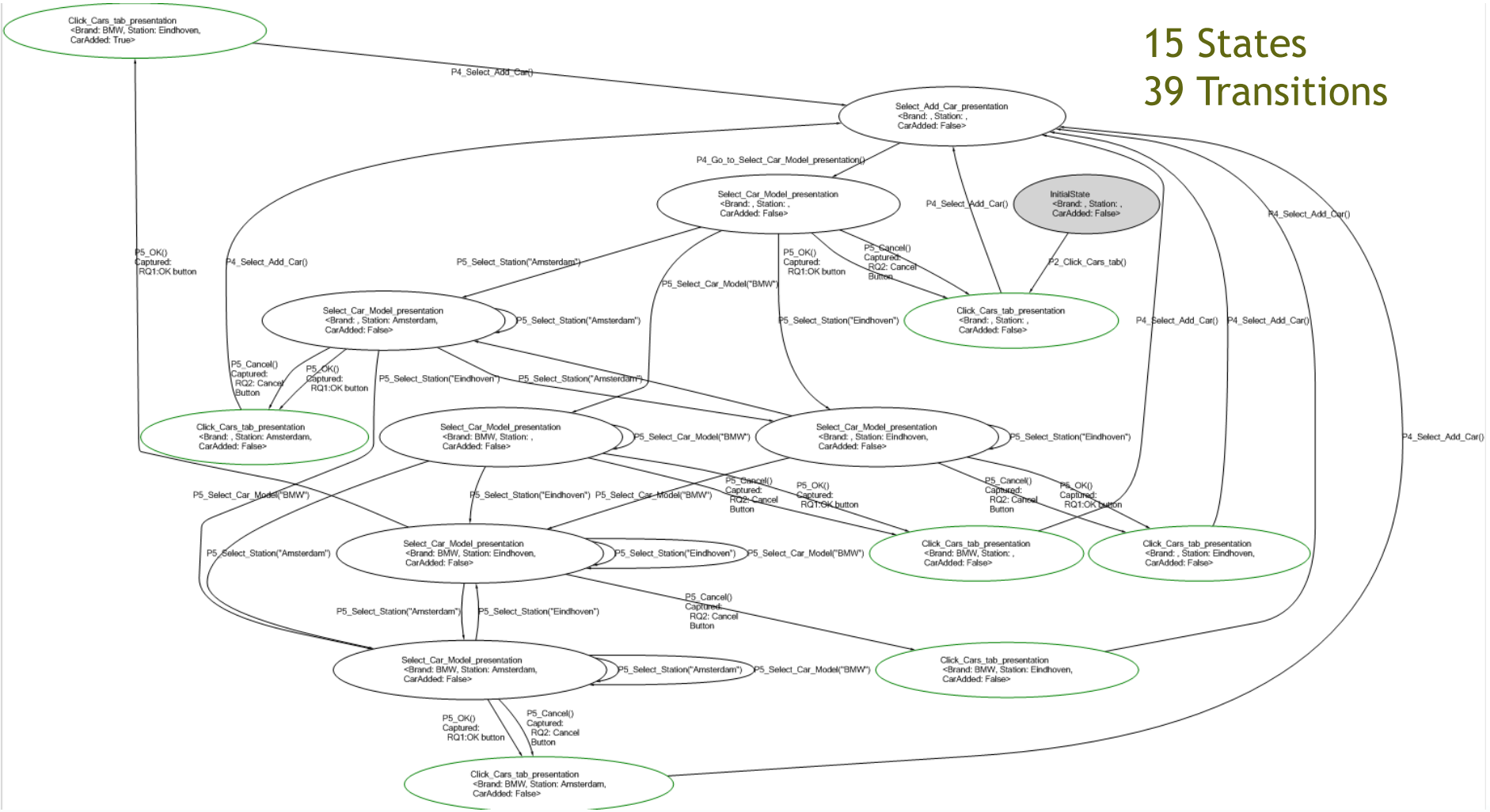
15 States
39 Transitions



MBT + UISPEC: SCLICING (REQUIREMENT COVERAGE)

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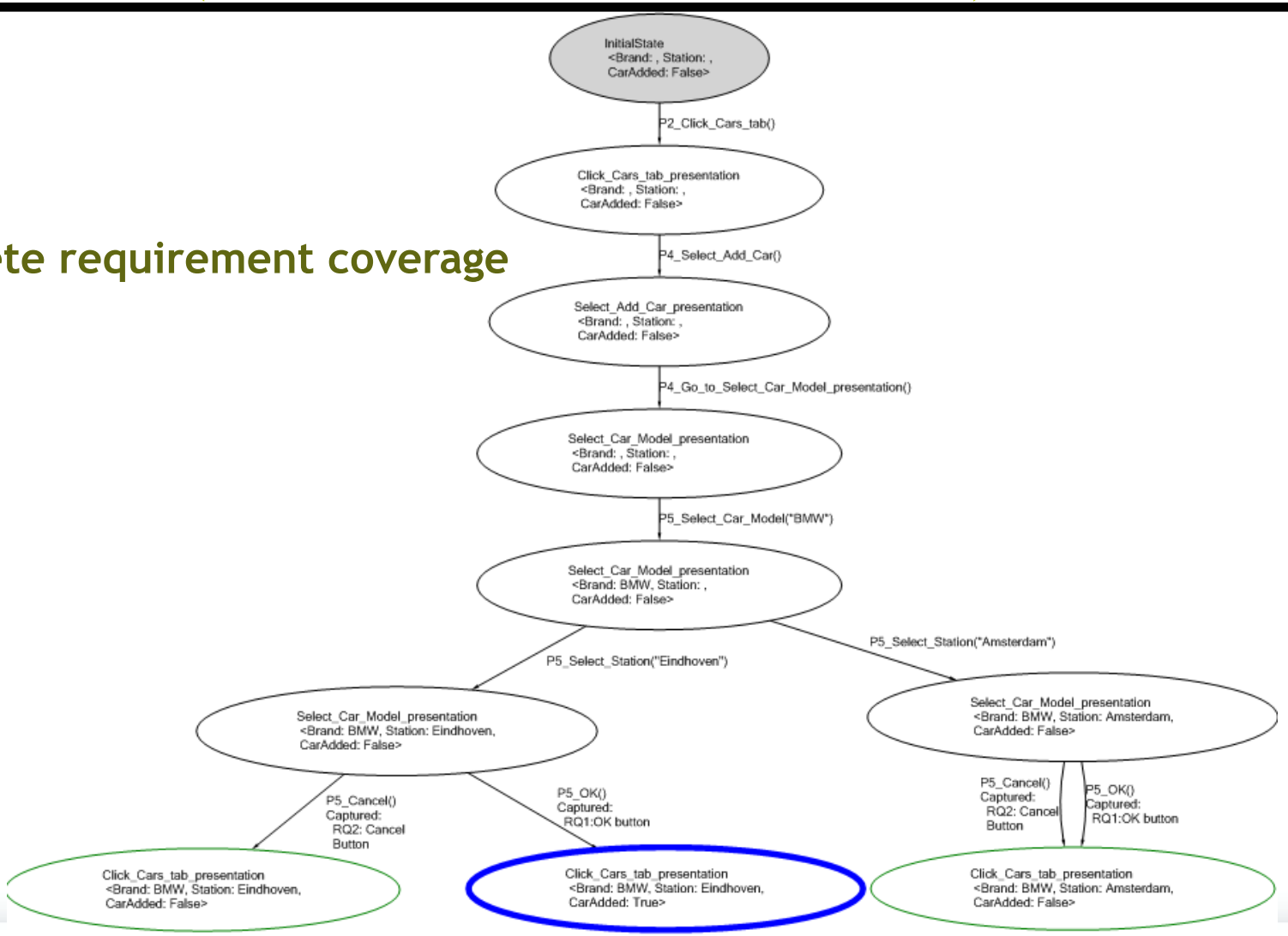
Complete requirement coverage



MBT + UISPEC: SOME OF GENERATED TEST CASES

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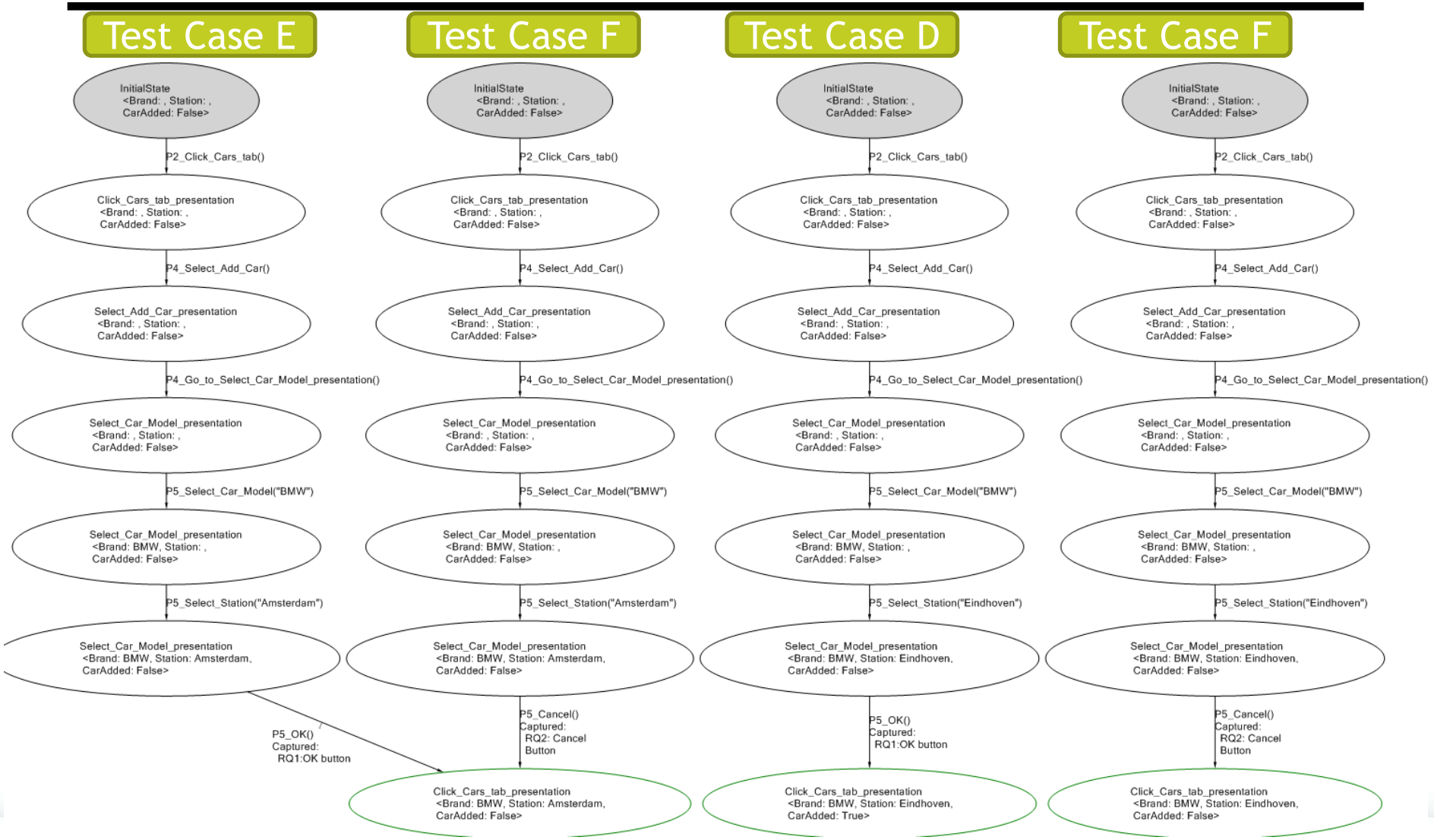

RESULTS

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	Manual test design and manual scripting (automatic test execution)	Model Based Testing (MBT) (automatic test execution)	MBT+ UIspec
SUT	Car reservation system (2 requirements)	Car reservation system (2 requirements)	Car reservation system (2 requirements)
Test Design (logical test case)	½ h for test specification	1 h modeling	½ h for creating task model
Test Generation (physical test case)	½ h for scripting the test cases	Automatic generation of 13 test cases	Automatic generation of 13 test cases
Test Execution	Automatic execution (MS UI automation)	Automatic execution (MS UI automation)	Automatic execution (MS UI automation)
Number of Test Cases	2 Test cases (2 test case/hrs)	13 Test cases (13 test case/hrs)	13 Test cases (26 test case/hrs)
Coverage	2 scenarios 2 req	All scenarios 2 req	All scenarios 2 req
Maintenance Effort (change /new requirements)	1 h for adding test scenario (new requirement)	½ h for updating SpecExplorer model	½ h for updating task model

CASE STUDY: PERCEIVED BENEFITS

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- **Communication/manage complexity**
  - Better communication; less misunderstanding
- **Test Automation Effort**
  - Reducing test specification effort by reusing task models
  - Increased productivity (Saving time and cost)
- **Maintainability /Agility**
  - Easier and safer Maintainability by using task models as one synchronization point
  - Changes in requirements → Update in Task Model → automatic update in Test cases

SUMMARY (WORKFLOW & TOOLS)

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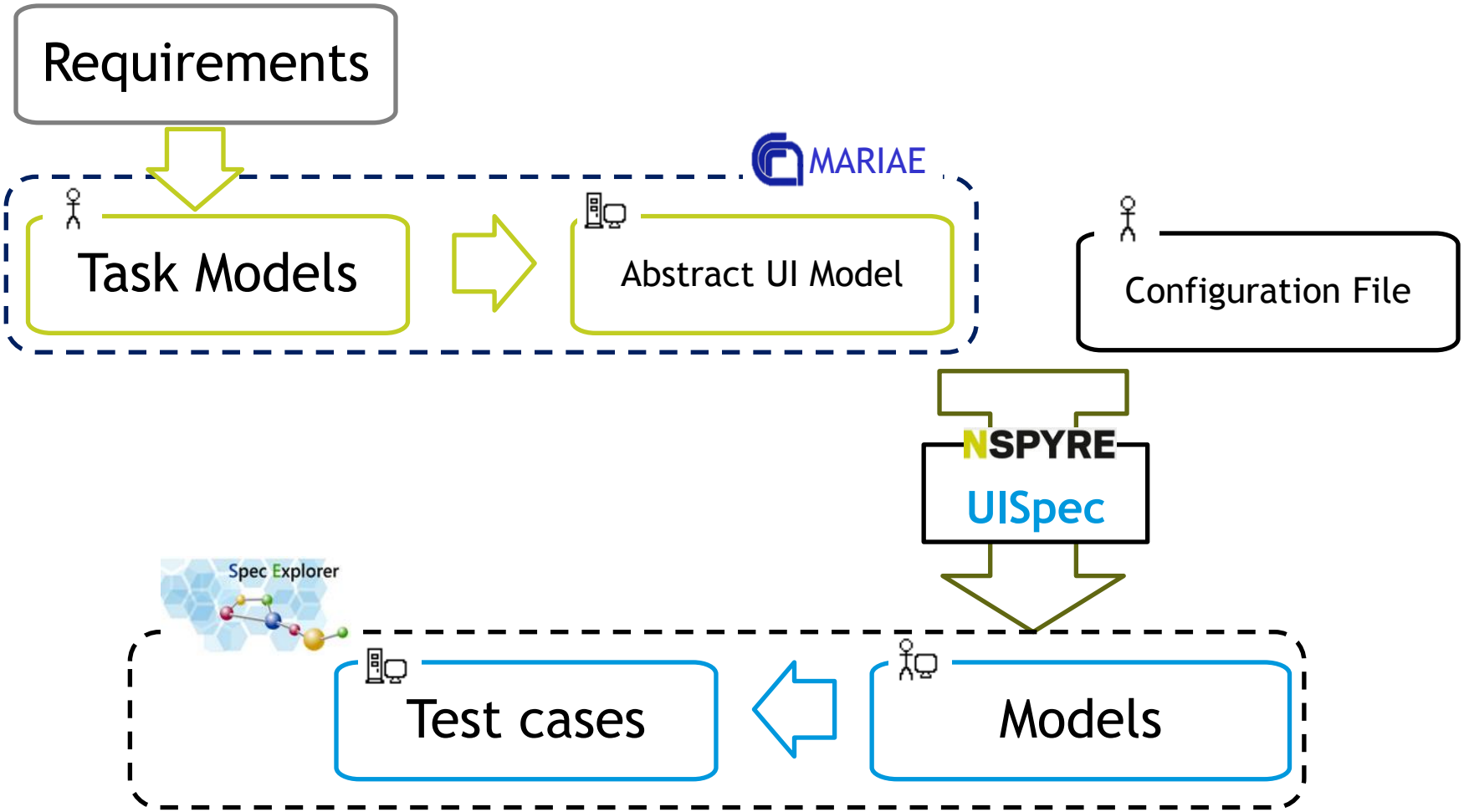

TOOL STATUS

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- Tool as an standalone application.
- (Pending) tool will be available as an open source Eclipse plugin for the Eclipse community.
- For now available on request

- Future steps
  - Support data handling/configuration aspects in UISpec, instead of relying on manual additions in Spec Explorer,
  - Supporting other MBT tools.

CONCLUSIONS

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- MDE and MBT technologies have matured a lot in the latest years
- It is a matter of time….. Evolution…..

QUESTIONS MATTER.

SO YOU WON'T HAVE ANY LEFT

MBT is…..
Strategies, tools and artifacts
Manage complexity
Reduces the need of manual or human involvement of interaction
Avoids spending time in unskilled repetitive error prone or redundant tasks
Provides bandwidth to Innovate!!

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