

TB141lc – ICT System Engineering and Rapid Prototyping

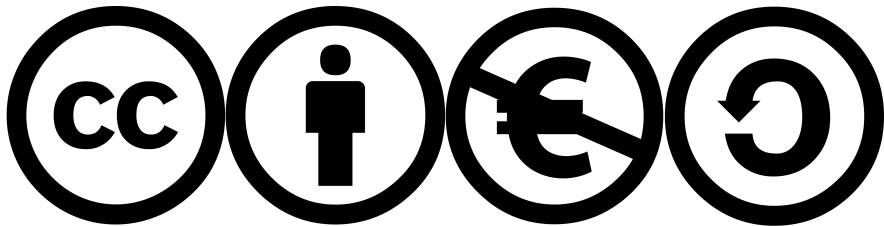
Mendix Advanced Aspects - Security, Mapping and Dashboarding

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Key dates for upcoming weeks

- **05/04** - Socio-technical analysis lecture - Mendix Q/A
- **11/04** - Deadline for feedback sociotechnical analysis
- **13/04** - Project deadline and final presentation (**online**)
- **14/04** - Q/A about course theory and example of exam questions (**online**)

Notable feedback points

- By separating main- and side information, the common thread would become clearer
- Clarify the exam content

Proposed improvements

- Slides improvements (mostly for next year)
- Publish a document containing a summary of topics for the exam and an example exam.
- Collect detailed feedback from the students about points that require improvement, add clarifications where required.

Learning objectives and related literature

Learning objectives

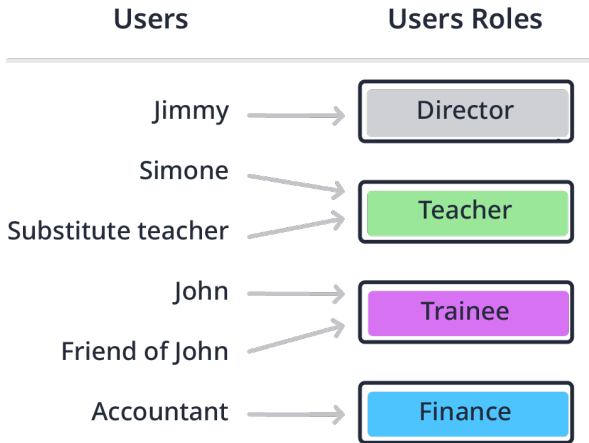
- Create a basic Mendix app
- Implement access control via Mendix built-in functionalities
- Implement geo-localisation using Mendix built-in map widget
- Implement data visualization using Mendix built-in graph widget

Related literature

- Mendix - Build an App in Mendix Studio Learning Path
- Mendix - Become a Rapid Developer Learning Path
- Mendix - Crash Course

Security in Mendix

Mendix - User Roles



- Roles that end users have in the application
- Mapped onto **Module Roles**

Source: Mendix Academy - Rapid Developer Learning Path

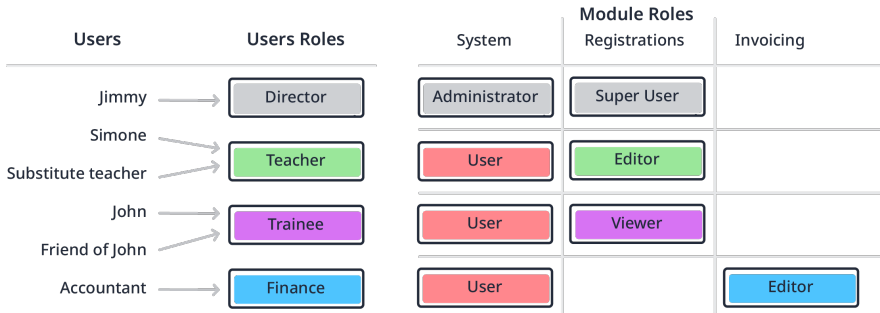
Mendix - Module Roles

System	Module Roles	Registrations
Administrator	Super User	
User	Editor	
User	Viewer	
User		Editor

- Internal representation of the different security/access levels

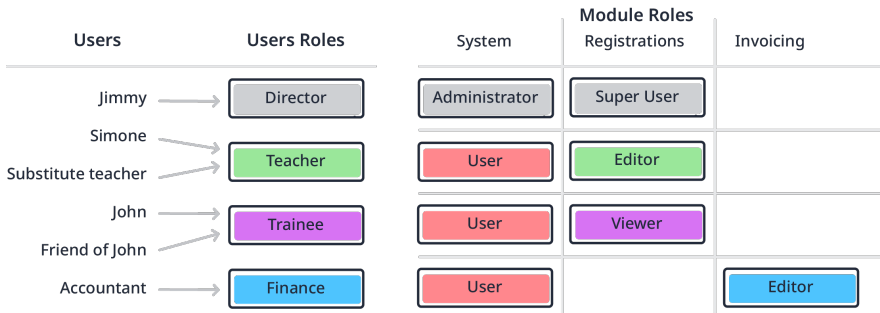
Source: Mendix Academy - Rapid Developer Learning Path

Mendix - User and Module roles mapping



Source: Mendix Academy - Rapid Developer Learning Path

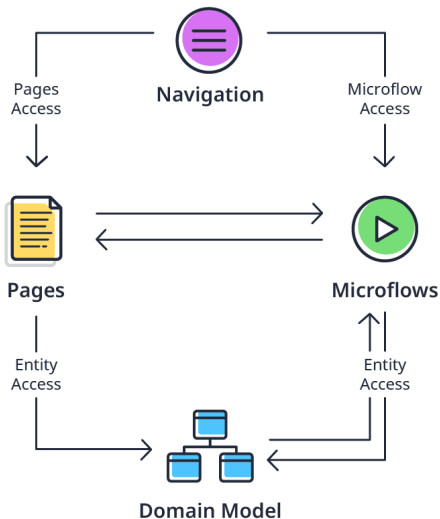
Mendix - User and Module roles mapping



Source: Mendix Academy - Rapid Developer Learning Path

What are the roles and the modules in your project?

Mendix - Access Rules



- Defined for each **Module Role**
- Determines the access policies for the different MVC components:
Pages,
Microflow and
Domain Model.

Mendix - Page Access

Security of Module 'MyFirstModule'

Module roles | **Page access** | Microflow access | Nanoflow access | Entity access

Note: Changes you make here modify the corresponding pages.

☐ Show unused pages

Open page

	Page	Administrator	User	Type
	Form_Businesses_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	Home_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	List_Businesses_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	List_ProductStock_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	Location_NewEdit_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	Product_NewEdit_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	ProductStock_NewEdit_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page
	TrainingEvent_NewEdit_Web	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Page

- Configured as Pages-Module Roles matrix
- The navigation items (menu bars/buttons) will show items only if access is granted.
- A page that is opened by a microflow will only open if the role is allowed to execute the microflow

Source: Mendix Academy - Rapid Developer Learning Path

Mendix - Microflow Access

Security of Module 'MyFirstModule'







Module roles Page access Microflow access Nanoflow access Entity access

Note: Changes you make here modify the corresponding microflows.

Yellow cells indicate microflows that have roles assigned to them but are never used f

☐ Show unused microflows

 Open microflow

Microflow	Administrator	User
 ACT_Business_ShowMessage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
 ACT_ProductStock_ComputeSubtotal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
 ACT_ProductStock_Save	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
 ACT_ProductStock_UpdateDate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
 ACT_Businesses_ComputeExpected...	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
 Test_Microflow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- Configured as Microflow-Module Roles matrix
- The navigation items (menu bars/buttons) will show items only if access is granted.
- Access settings are only checked when the microflow is executed from the client. A microflow called as a sub-microflow or a microflow set as an event handler will be run if the user has access to the calling microflow or if the related entity event is allowed for the user.

Source: Mendix Academy - Rapid Developer Learning Path

Mendix - Entity Access

Security of Module 'MyFirstModule'

Module roles	Page access	Microflow access	Nanoflow access	Entity access
Note: Changes you make here modify the domain model.				
New Edit Delete Duplicate				
Entity	Module roles	Create	Delete	Member access
Business	User, Administrator	Yes	Yes	Full Read, Full Write
Course	User, Administrator	Yes	Yes	Full Read, Full Write
Location	User, Administrator	Yes	Yes	Full Read, Full Write
Locations	User, Administrator	Yes	Yes	Full Read, Full Write
Product	User, Administrator	Yes	Yes	Full Read, Full Write
ProductStock	User, Administrator	Yes	Yes	Full Read, Full Write
Trainer	User, Administrator	Yes	Yes	Full Read, Full Write
TrainingEvent	User, Administrator	Yes	Yes	Full Read, Full Write

- Configured as Create, Read, Update, and Delete (CRUD) matrix per module roles.
- Module roles can be allowed to create and delete objects, and to view and edit member values (attributes and association)
- Every access rule is applicable to one or more module roles.
- The set of objects available for viewing, editing and removing can be limited by means of an XPath constraint.
- Rules are additive, which means that if multiple access rules apply to the same module role, all access rights of those rules are combined for that module role.

Source: Mendix Academy - Rapid Developer Learning Path

Mendix - Checklist for security

- ① Enable Security
- ② Define User Roles
- ③ Define Module Roles
- ④ Map User-Module Roles
- ⑤ Define access rules
 - Entity rules
 - Page rules
 - Microflow rules

Source: Mendix Academy - Rapid Developer Learning Path

Now it is your turn to develop...

Mendix - Development - Exercise 16

Create a new application to manage Students and implement security at the Domain Model level.

In order to do so, you need to:

- 1 Create a new app
- 2 Add a new entity `Student` to the domain model
- 3 Create the corresponding form and overview pages.
- 4 Enable security.
- 5 Add a new **Domain Model Rule** to only allow **Read** access to the User Module role.

Test the application to see what the implication of your access control rule are. The constraints need to be introduced via **Mendix Studio Pro**.

Mendix - Development - Exercise 17

Based on the application developed in **Exercise 16**, introduce a conditional visualization rule on the pages that are made inaccessible based on the previously introduced rules.

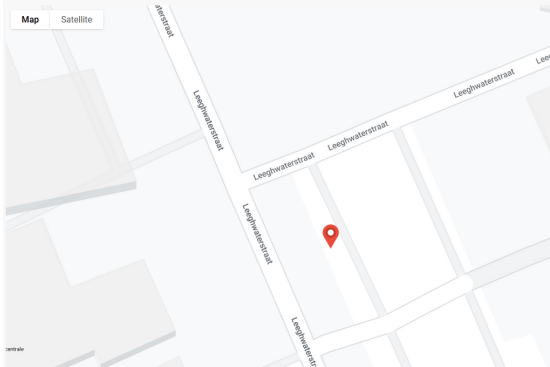
The constraints need to be introduced via **Mendix Studio Pro**.

Mapping

Mendix - Mapping

The Shop

Jaffalaan 5, 2628 BX Delft, Netherlands



- Mapping requires either the **address** or the **latitude-longitude** information of the location to visualize.
- These information need to be **stored in the domain model** and **mapped onto the corresponding map widget**.
- Using the address requires geo-coding (i.e. transforming to latitude-longitude) and does not work reliably.

Now it is your turn to develop...

Mendix - Development - Exercise 18

Based on the application defined in **Exercise 13**, add the visualization the localization of the business on a map, reachable from the shop overview page.

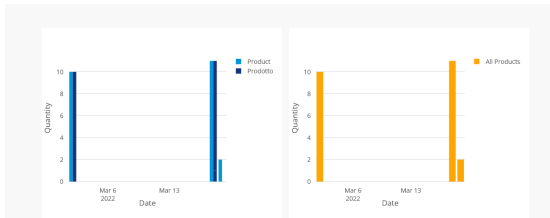
In order to do so, you need to:

- 1 Create a new page
- 2 Add a map widget to the page
- 3 Update the Domain Model in order to include the required attributes in the Business entity
- 4 Map the newly created attributes onto the map widget.

Test the application to verify the correct visualization on the map.

Dashboarding

Mendix - Dashboarding



- Graphing require to define a **Series** of elements to plot.
- A **Series** requires a list of objects to be represented, which can be obtained **via retrieve from database + XPath constraints** or **via a microflow**.
- In the **Series** configuration, specific mapping between attributes of the objects and X-Axis, Y-Axis are defined.
- Each graph has different constraints on the datatypes for the X,Y axes.

Now it is your turn to develop...

Mendix - Development - Exercise 19

Based on the application defined in **Exercise 13**, add the visualization of the sales of the application over time, reachable from the shop overview page.

In order to do so, you need to:

- 1 Create a new page
- 2 Add a graph widget to the page
- 3 Update the Domain Model in order to add a new **Sale** entity including a quantity and a sale date, and relationship to **Business** and **Product** entities
- 4 Create a microflow to retrieve all the sales related to the considered shop
- 5 Configure the graph widget in order to include a **Series**, based on the aforementioned microflow, and to use sales date as **X-Axis attribute** and quantity as a **Y-Axis attribute**.

Test the application to verify the correct visualization of the graph.