The training will start at 9:00

mendix

Intermediate Developer

Introduce yourself

Where do you work?

How long have you worked with Mendix?

What do you hope to learn in this course?

Agenda

1 The SCRUM methodology applied

2 Laying out the basics

3 Branding

4 Adding requests

5 Approving requests

6 Notifications

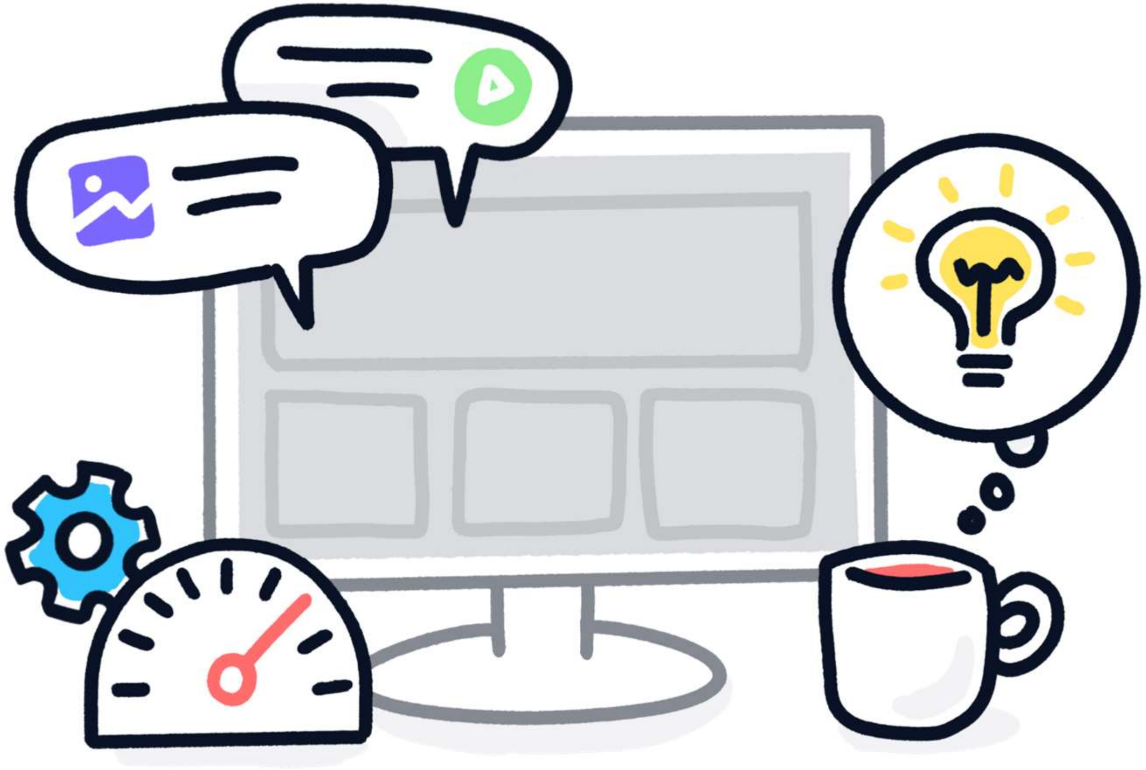
7 Translation

8 Conclusion

The SCRUM methodology applied

Learning goals

- What responsibilities there are in software development.
- Who is accountable for those responsibilities.
- Which events are used in the Scrum methodology.



The Five values of Scrum

Focus

Courage

Openness

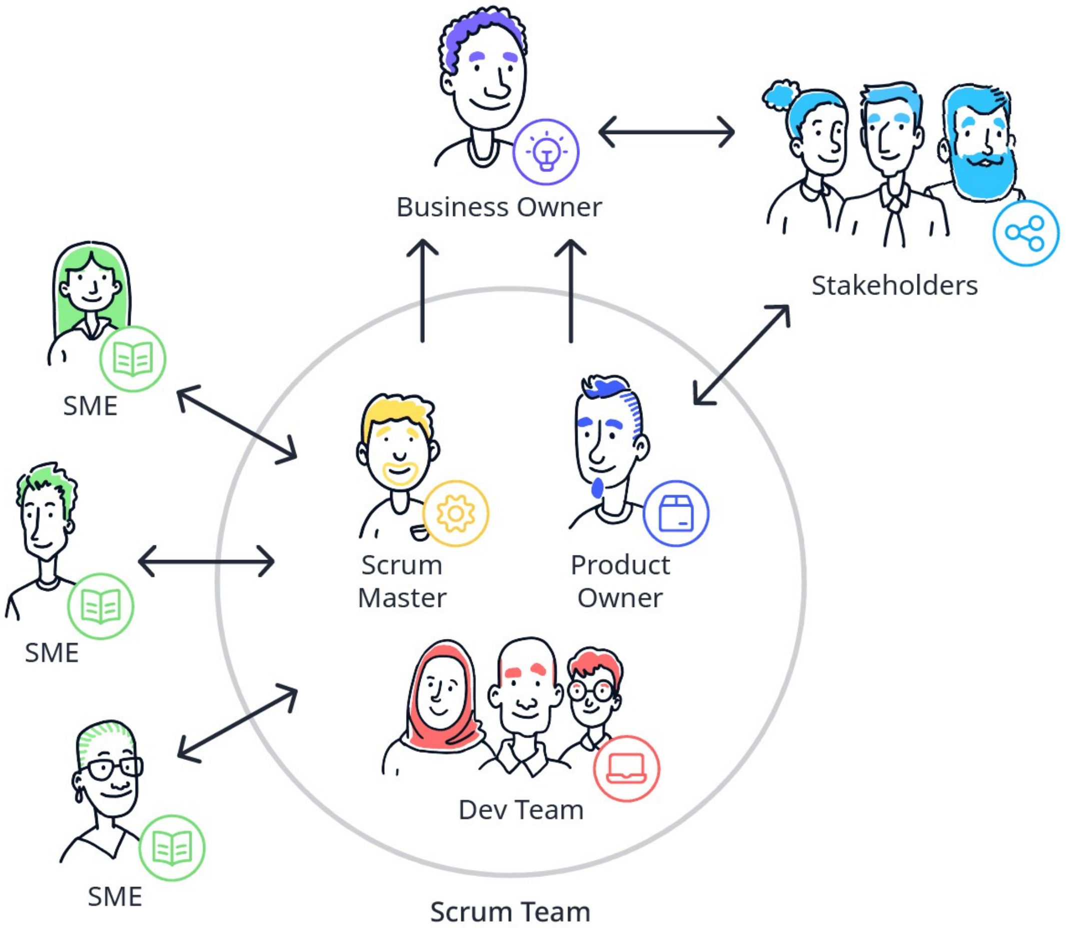
Commitment

Respect

Team Size & Location

- Teams of 3
  - Big enough to build awesome features
  - Small enough for easy collaboration

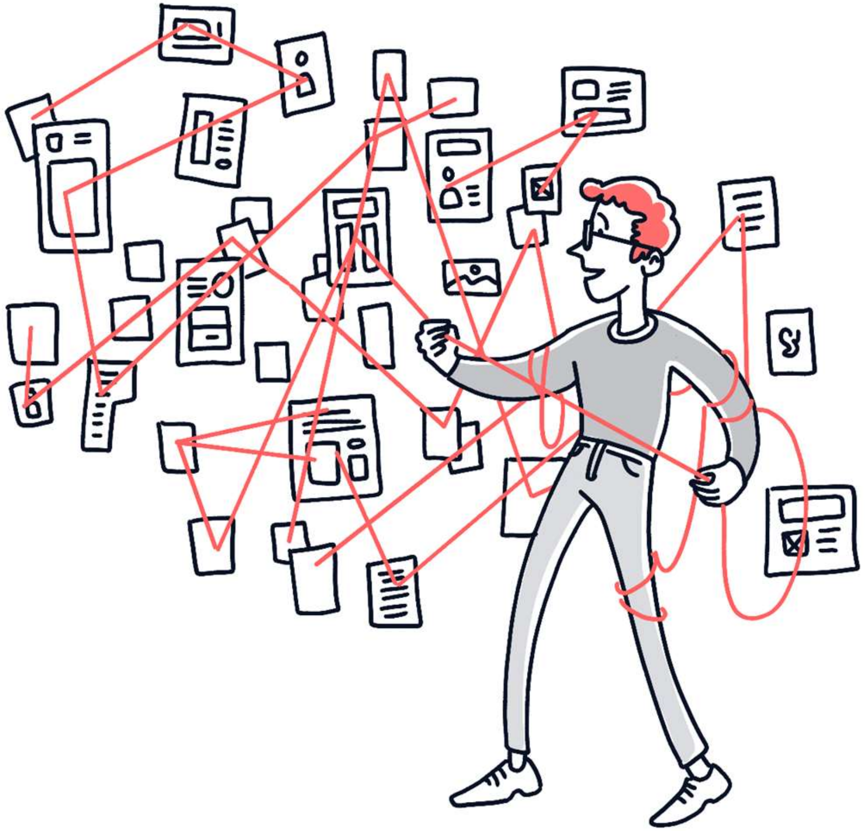
- Recommended to work in single place (scrum room)
- Direct and quick communication is key
- Offshoring more complicated



mx mendix

Sprint 0

- Preparation period of one or two weeks
- Get familiar with:
  - overall picture
  - organization
  - stakeholders & SMEs
  - availability of team and stakeholders/SMEs
- Have official kick-off meeting
- Product Backlog Refinement meeting



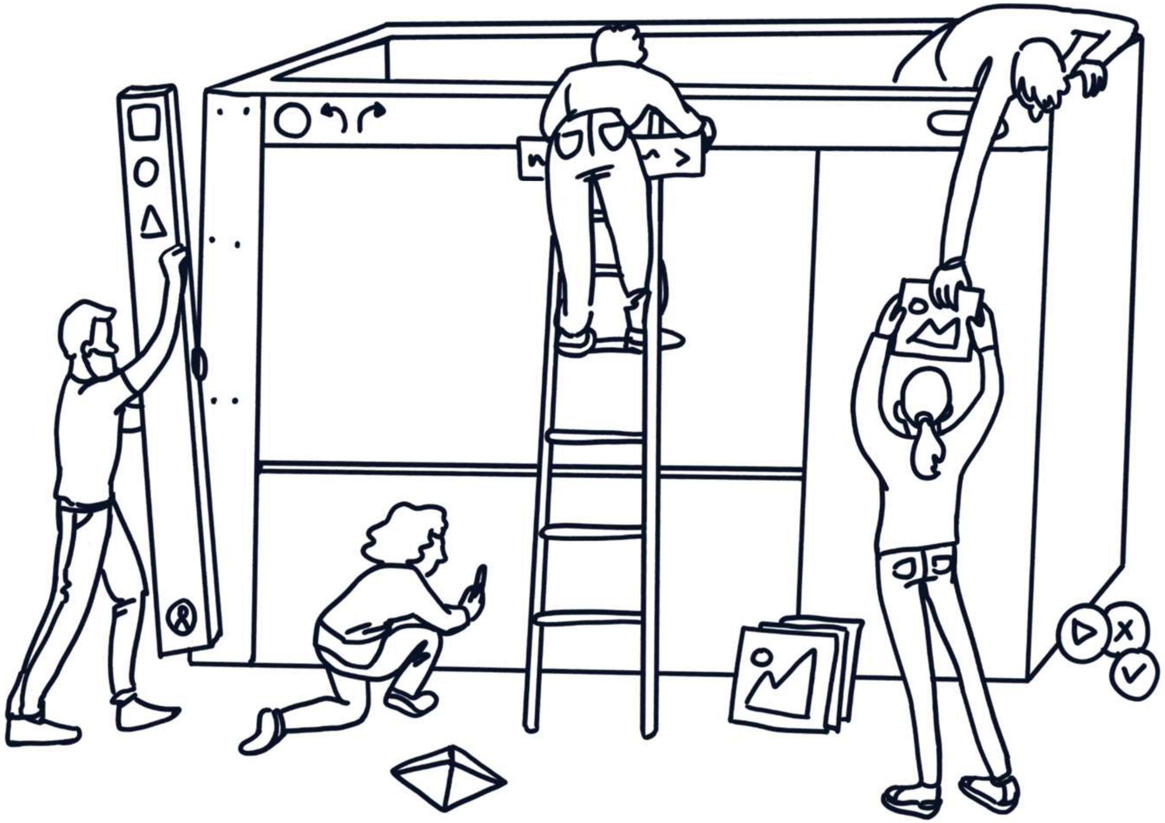
Our Use Case: North Sea Shipbuilding

Andrea is the CEO of North Sea Shipbuilding. She wants her employees to have an easy way of requesting time off. It's also important that managers can approve or reject those requests, and that they can see who has time off when.

SCRUM events

Sprints contain and consist of:

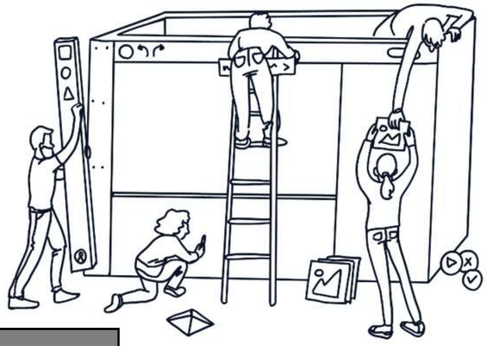
- Sprint planning
- Daily Scrums
- Development work
- Sprint review
- Sprint retrospective.



SCRUM events

Event	Inspection	Adaptation
Sprint Planning	• Product Backlog • Increment • Actions of the last Sprint • Definition of Done	• Sprint Goal • Forecast • Sprint Backlog
Daily Scrum	• Progress towards Sprint Goal	• Sprint Planning • Sprint Backlog
Sprint Review	• Increment • Sprint • Product Backlog	• Product Backlog • Change Planning • Release
Sprint Retrospective	• Work Method/ Process • Engineers practitioners • Definition of Done	• Actionable committed improvements

SCRUM events

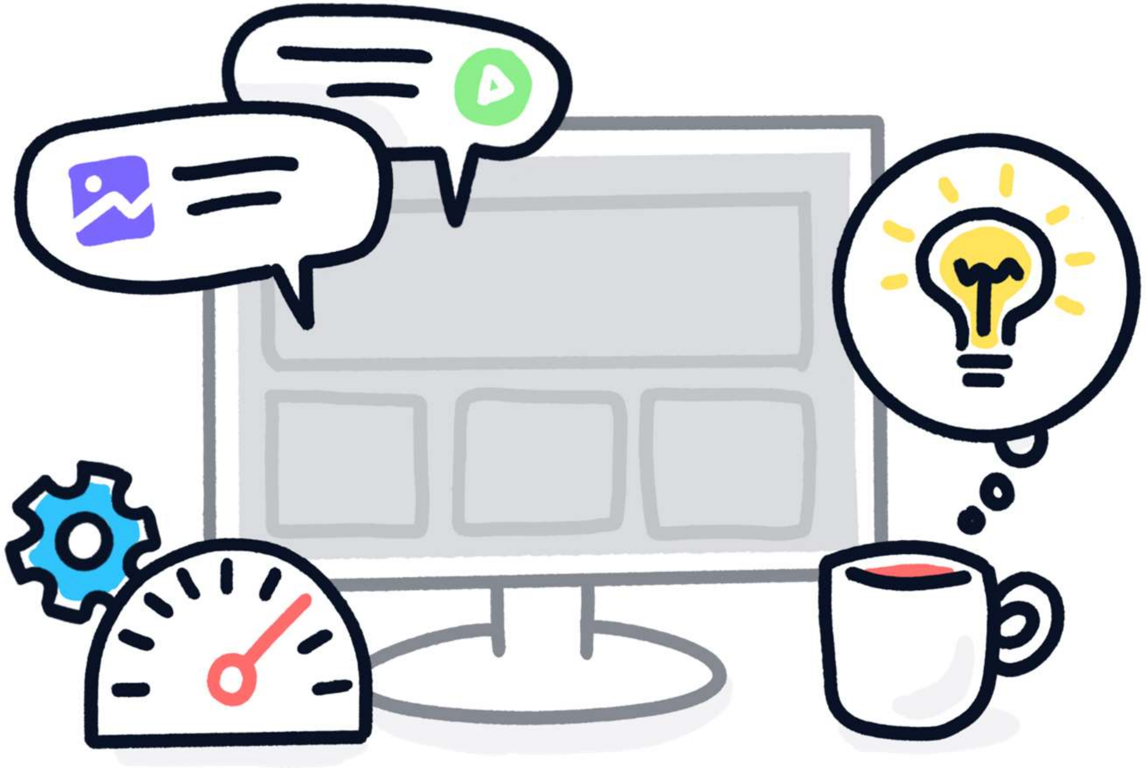


Event	4 Weeks	3 Weeks	2 Weeks	1 Week
Sprint Planning	8 hrs	6 hrs	4 hrs	2 hrs
Daily Scrum	15 min daily	15 min daily	15 min daily	15 min daily
Sprint Review	4 hrs	3 hrs	2 hrs	1 hr
Sprint Retrospective	3 hrs	2.25 hrs	1.5 hrs	0.75 hr

Laying out the basics

Learning goals

- Import modules from the AppStore
- Extending AppStore modules
- Layout with Flexboxing
- XPath basics

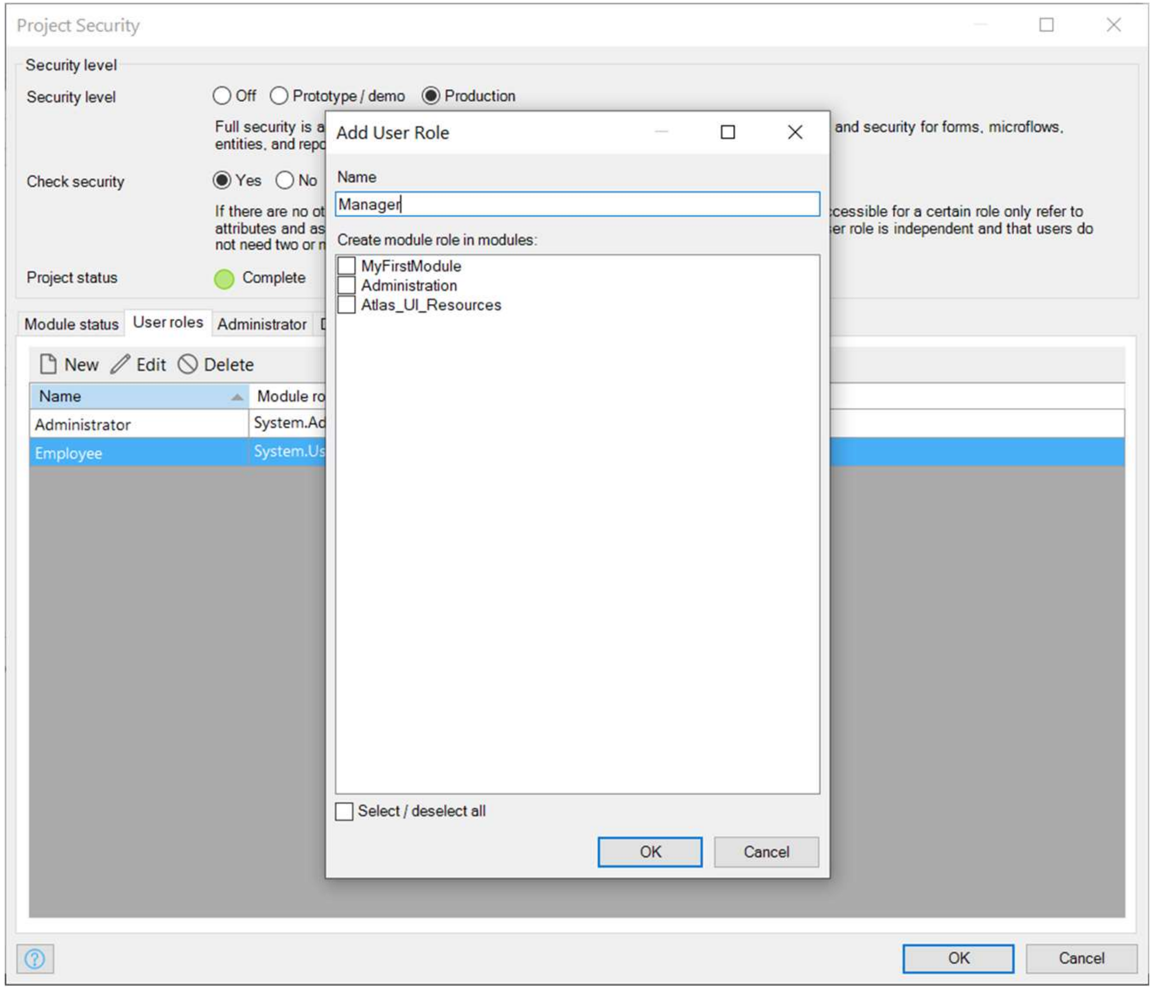


Userstory

As an authorized user I want to be able to add a profile picture so people can easily identify me

Create the app!

- Name: **Vacation Tracking**
- Theme: **Blank app**
- Security level: **Production**
- User roles: **Administrator, Employee, Manager**
- Make sure the **Manager** role is a user in the Administration module



Project Security

Security level

Security level ○ Off ○ Prototype / demo ● Production

Full security is a... and security for forms, microflows, entities, and repo...

Check security ● Yes ○ No

If there are no ot... ...cessible for a certain role only refer to attributes and as... ...er role is independent and that users do not need two or m...

Project status Complete

Module status | User roles | Administrator

New | Edit | Delete

Name	Module ro...
Administrator	System.Ad...
Employee	System.Us...

Add User Role

Name

Manager

Create module role in modules:

□ MyFirstModule
□ Administration
□ Atlas_UI_Resources

□ Select / deselect all

OK | Cancel

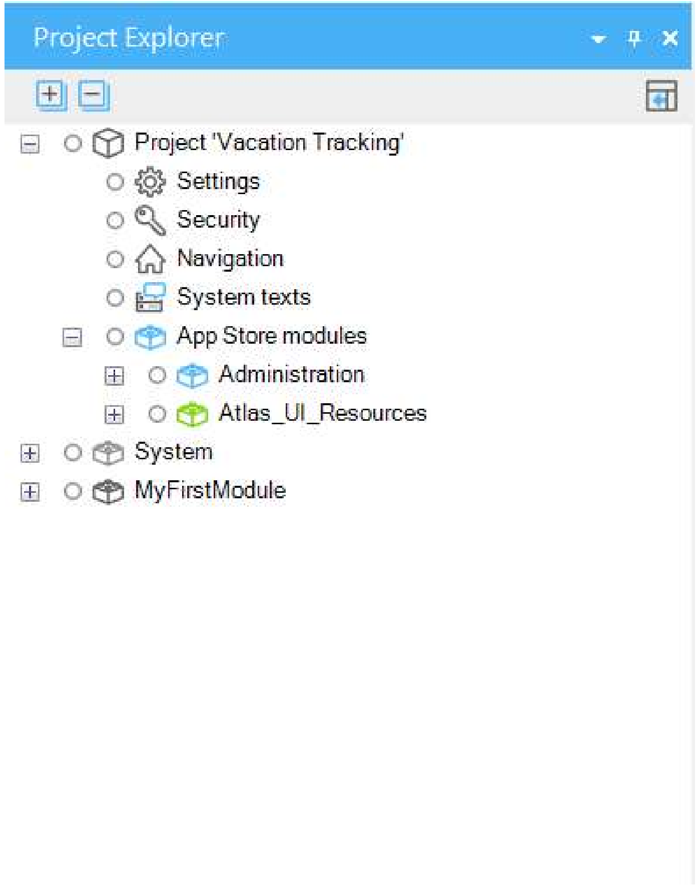
OK | Cancel

Appstore modules

- Two modules are sometimes changed
  - Administration
  - Atlas_UI_Resources
- All other modules are always extended

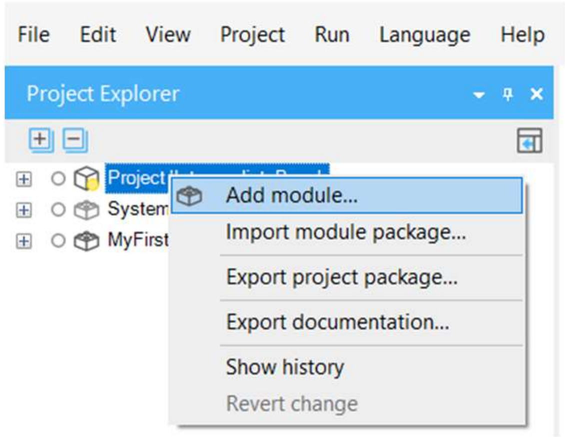
Use extension because:

- Any changes are overwritten when you update
- Preferred way to add functionality is extending

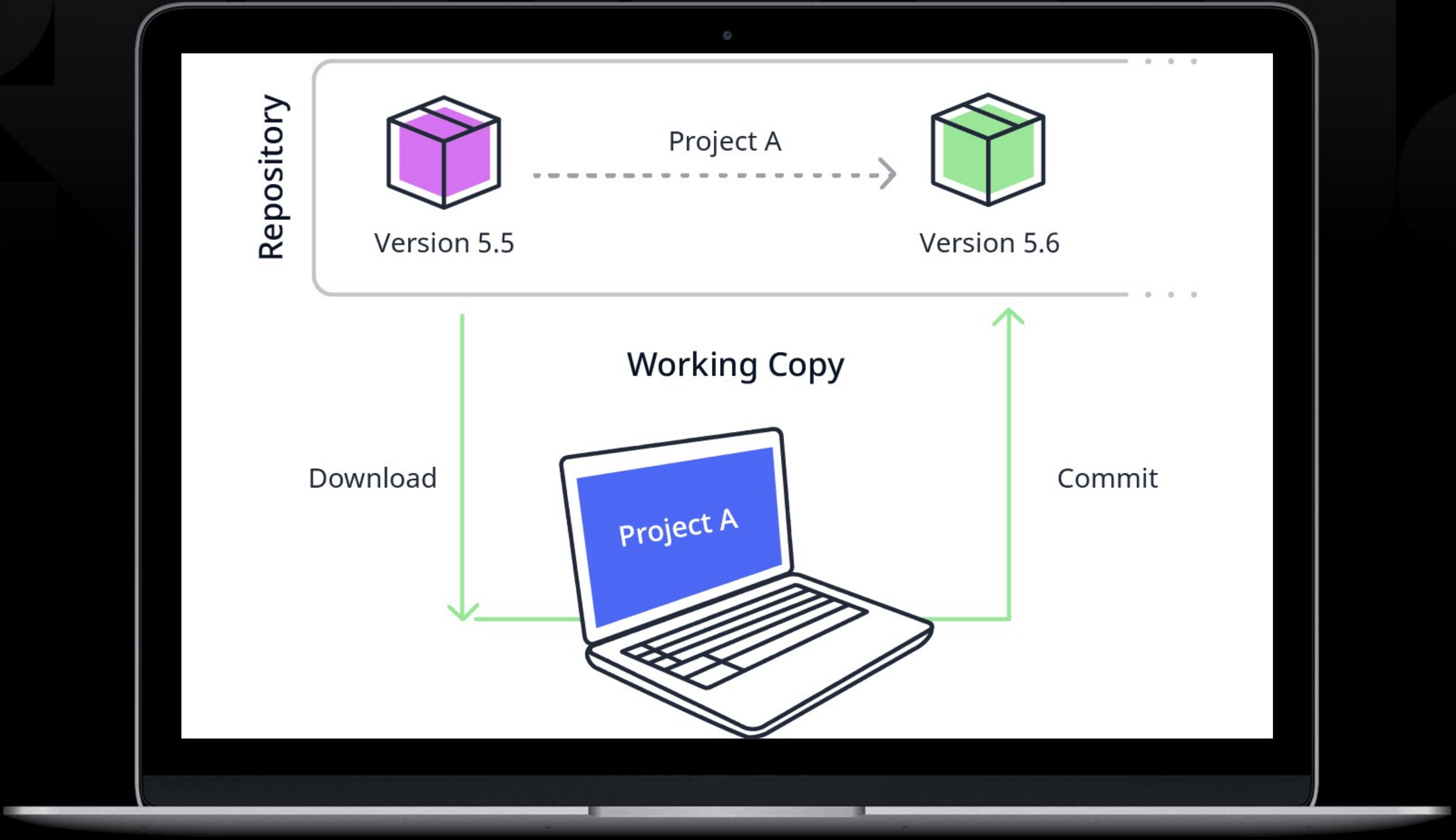


Create new GeneralExtentions module

- Right-click on the Project node
- Select **Add Module…** to create a new module
- Give it the name **GeneralExtentions**
- Add two user roles to your **GeneralExtentions**
    - Administrator
    - User
- Link the new module roles to the user roles in project security



Commit your work



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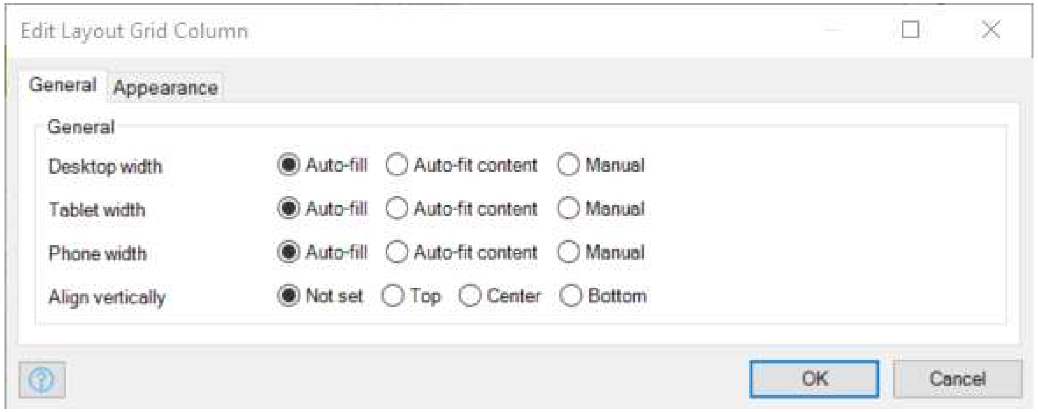
Userstory

As an administrator I want to manage accounts using a more modern interface

Layout Grid

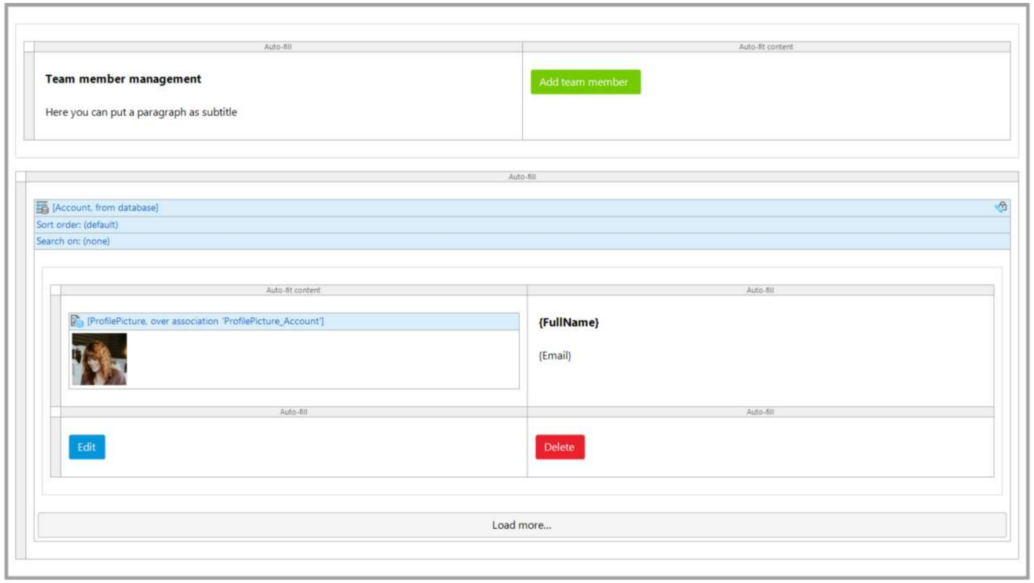
- Layout grid is based on Flexboxing
- Supports unlimited number of columns
- Three options can be selected
  - Auto-fill: Divide available space over all auto-fill columns
  - Auto-fit content: Take as much space as content requires
  - Manual: revert to old layout grid


Edit Layout Grid Column

General | Appearance

General

Desktop width	● Auto-fill	○ Auto-fit content	○ Manual	
Tablet width	● Auto-fill	○ Auto-fit content	○ Manual	
Phone width	● Auto-fill	○ Auto-fit content	○ Manual	
Align vertically	● Not set	○ Top	○ Center	○ Bottom


Team member management

Here you can put a paragraph as subtitle

[Account, from database]
Sort order: (default)
Search on: (none)

[ProfilePicture, over association 'ProfilePicture_Account']

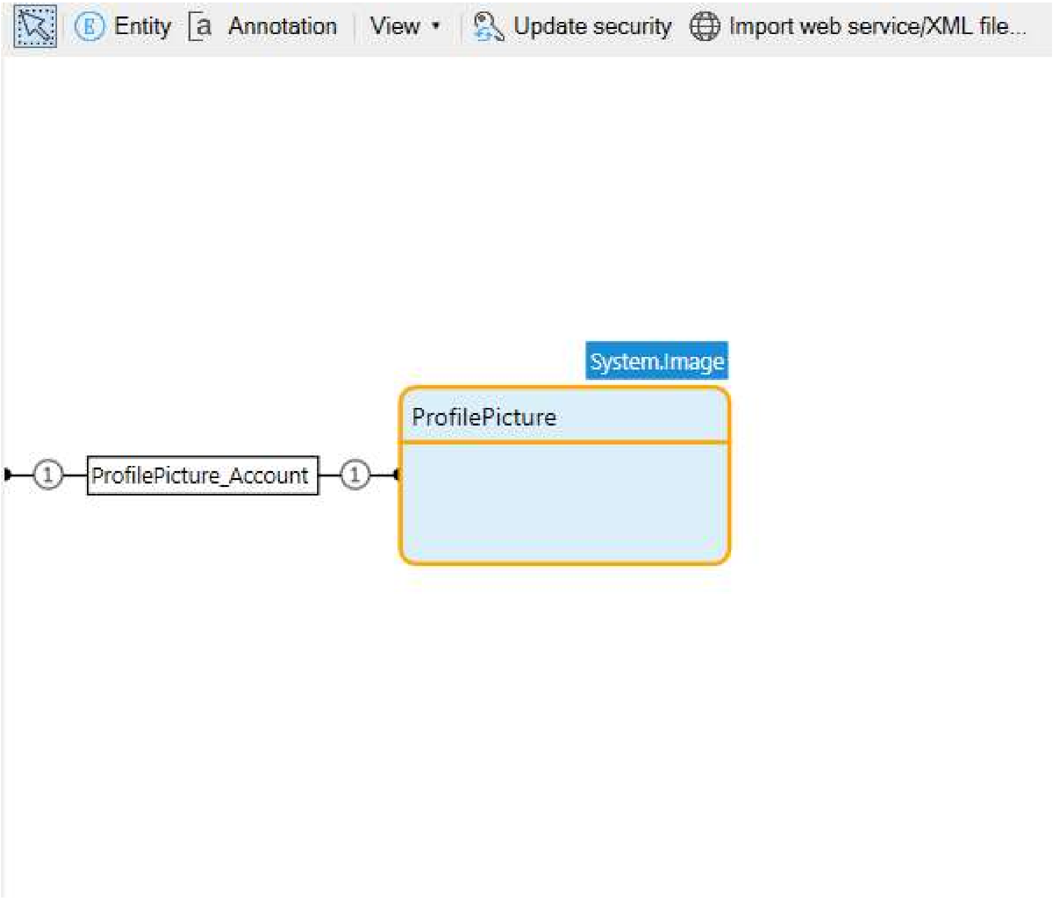
{FullName}

{Email}

mx mendix

Cross module associations

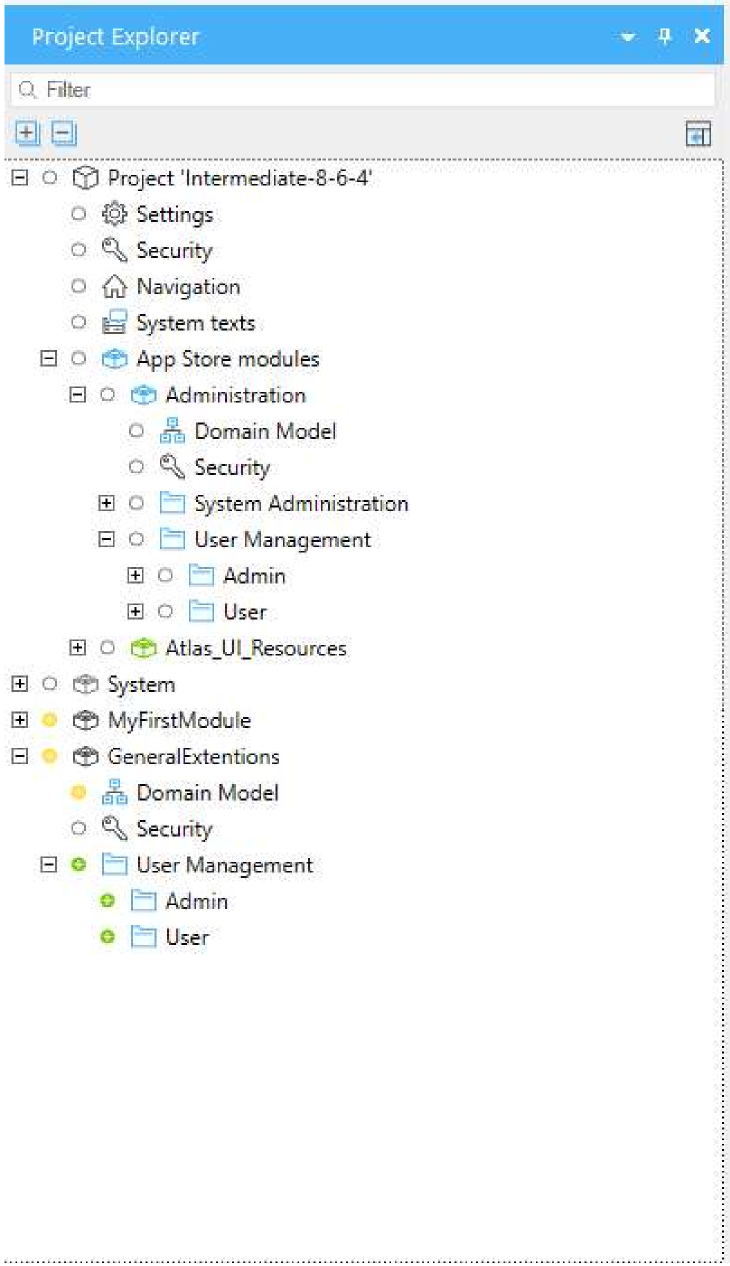
- System & Administration module
- MyFirstModule
- Big app = multiple modules?



Organize your project

It is important to keep your project organized so let’s duplicate the **Administration** folder structure to get into the habit.

- Create a folder named **User Management** in your general extensions module.
- Create a folder named **Admin** in your **User Management** folder.
- Create a folder named **User** in your **User Management** folder.



Project Explorer

Filter

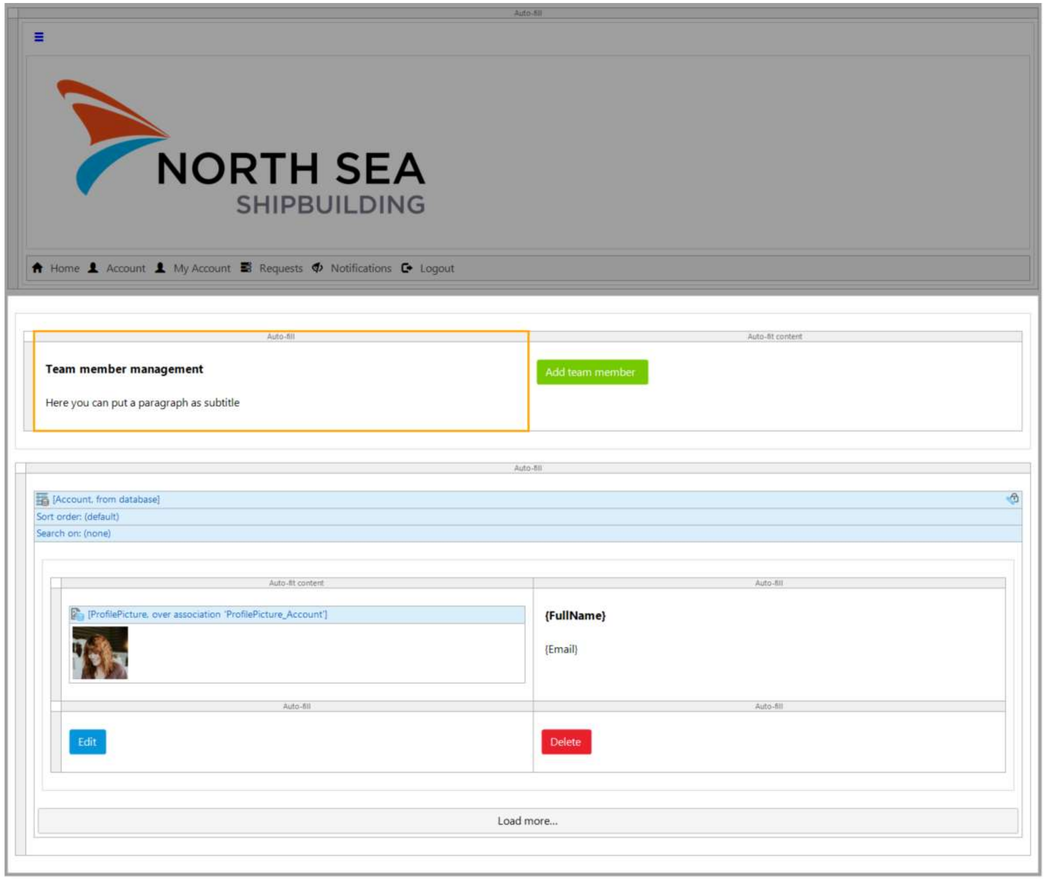
- Project 'Intermediate-8-6-4'
  - Settings
  - Security
  - Navigation
  - System texts
  - App Store modules
    - Administration
      - Domain Model
      - Security
      - System Administration
      - User Management
        - Admin
        - User
    - Atlas_UI_Resources
  - System
  - MyFirstModule
  - GeneralExtentions
    - Domain Model
    - Security
    - User Management
      - Admin
      - User

Managing Accounts

- Add an entity to the **GeneralExtentions** module called **ProfilePicture**
  - 1-1 association with **Account** entity
  - Generalizes from **Image** entity

- Build new Administrator functionality in the **GeneralExtentions** module
  - New **Account_Overview** page:
    - Layout: **Atlas_Topbar**
    - Template: **List Block**
  - Match the design
  - Extend existing New, Edit and Delete buttons. Choose between microflow and default behavior

- Add the page to the navigation menu
- Fix security errors



Team member management

Here you can put a paragraph as subtitle

[Account, from database]
Sort order: (default)
Search on: (none)

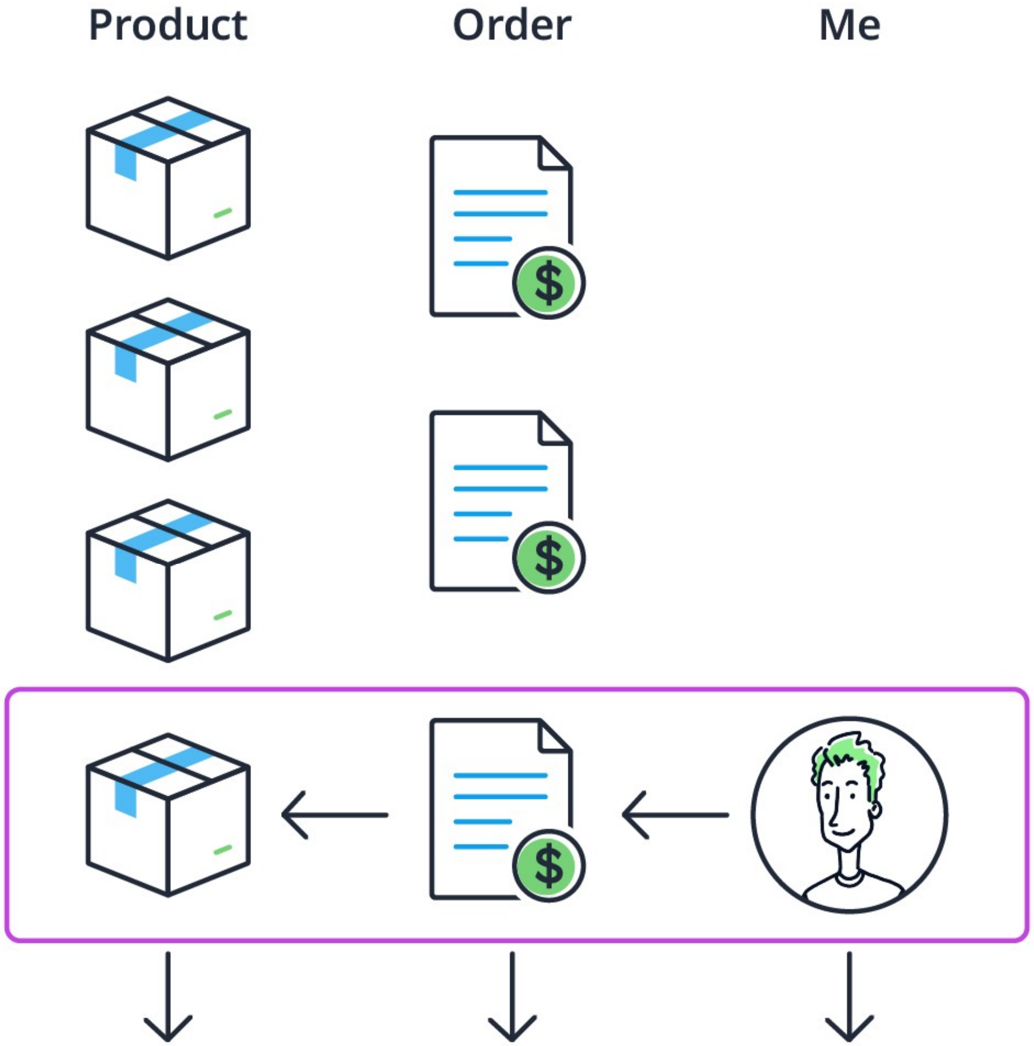
[ProfilePicture, over association 'ProfilePicture_Account']

{FullName}

{Email}

Constraining data with XPath

- Constrain data using entities, attributes, assocations & variables
- SQL or OQL are similar syntaxes
- Tokens (//, [], /, ())



//Product/[Product_Order/Order/Order_Person = Me]

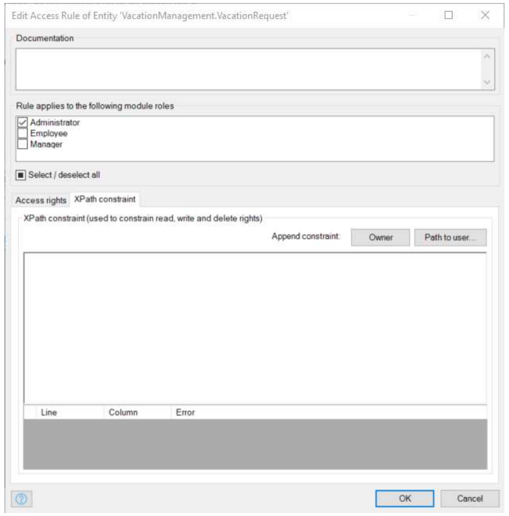
Where do we use XPath?

- XPaths on pages, to filter data or selectable objects
- XPaths in microflows, to define queries to the database
- XPaths in security

//Product/[Product_Order/Order/Order_Person = Me]

Added by Studio Pro

XPath expression you write in Studio Pro



Edit Access Rule of Entity 'VacationManagement.VacationRequest'

Documentation

Rule applies to the following module roles

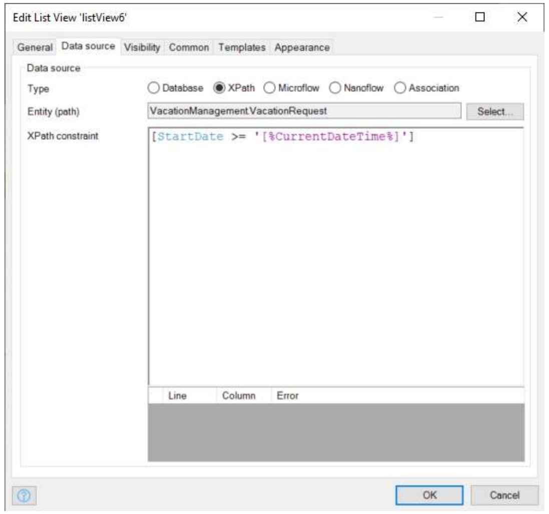
☑ Administrator
☐ Employee
☐ Manager

■ Select / deselect all

Access rights | XPath constraint

XPath constraint (used to constrain read, write and delete rights)

Line	Column	Error



Edit List View 'listView6'

General | Data source | Visibility | Common | Templates | Appearance

Data source

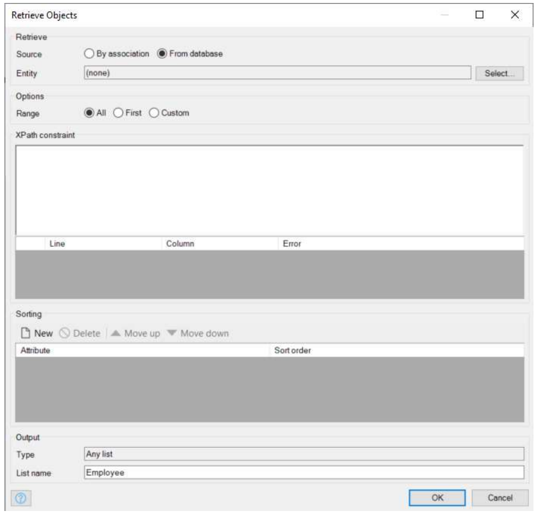
Type: ○ Database ● XPath ○ Microflow ○ Nanoflow ○ Association

Entity (path): VacationManagement.VacationRequest

XPath constraint:

```
[StartDate >= '[%CurrentDateTime%]']
```

Line	Column	Error



Retrieve Objects

Retrieve

Source: ○ By association ● From database

Entity: (none)

Options

Range: ● All ○ First ○ Custom

XPath constraint

Line	Column	Error

Sorting

Attribute	Sort order

Output

Type: Any list

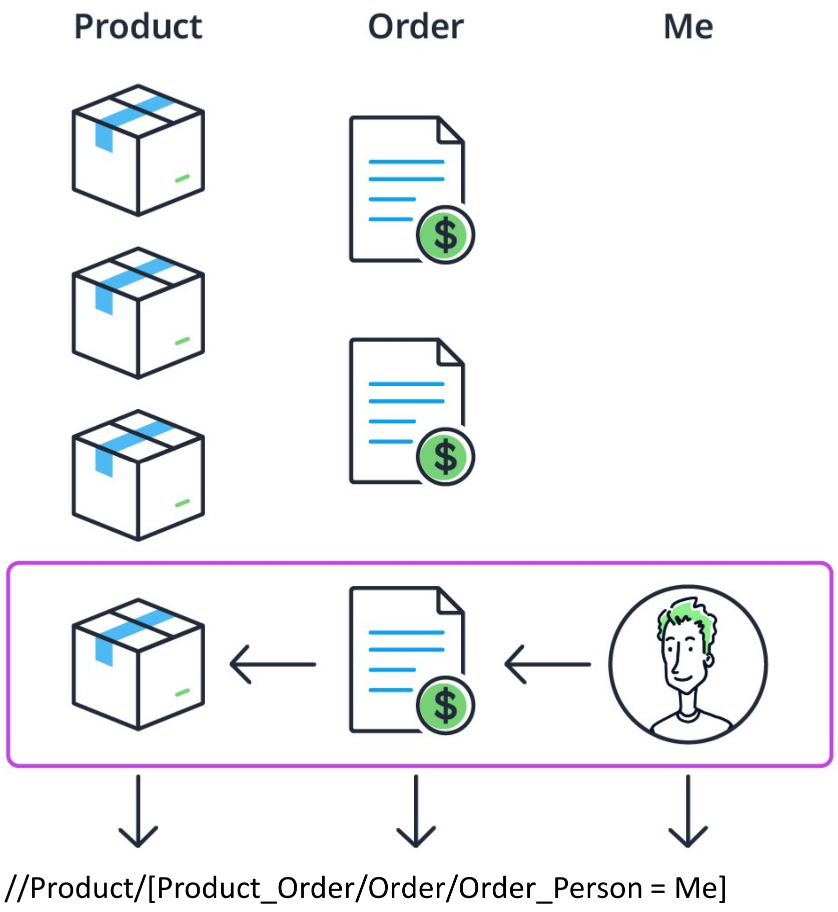
List name: Employee

How to structure an XPath

- Entities, attributes & associations

How can Mendix help you?

- Use CTRL + Space
- Know your domain model
- Well-organized domain model (apply naming conventions)
- Split your screen



//Product/[Product_Order/Order/Order_Person = Me]

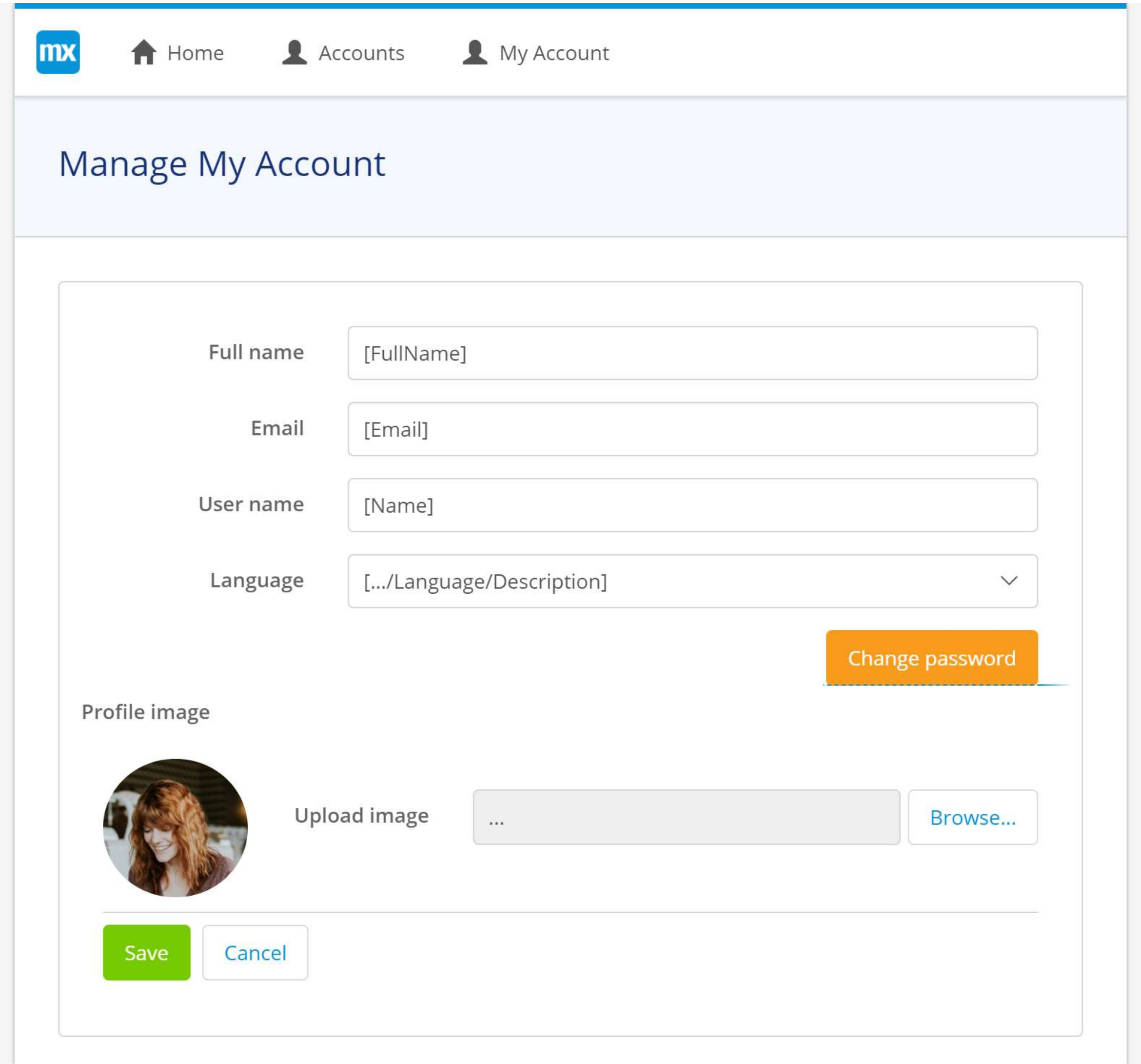
Using simple constraints

- Constrain data using Enumeration values
- Constrain data using string comparison
- Constrain using Mendix System Variables
  - Current Object
  - Current User
  - Other system variables (ie current session, datetime related)

Managing My Account

- Build Manage My Account functionality
  - Use or copy the ManageMyAccount microflow
  - Add to navigation
  - Create a new Manage My Account page
  - Make sure that only users can edit their profile picture and the rest can only view

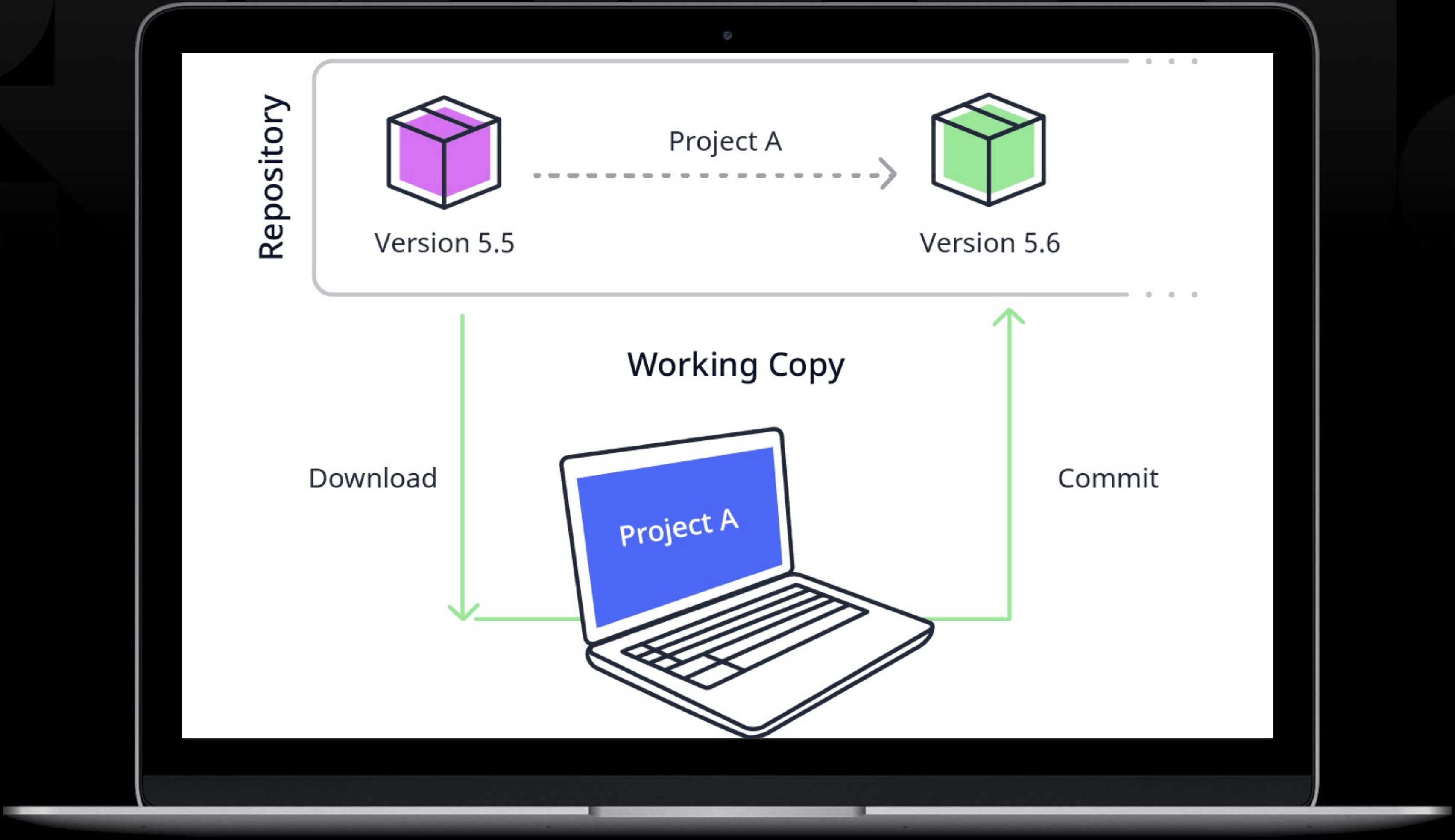
- Add the page to the navigation menu
- Fix security errors
- Deploy & view



Manage My Account

Full name	[FullName]
Email	[Email]
User name	[Name]
Language	[.../Language/Description]

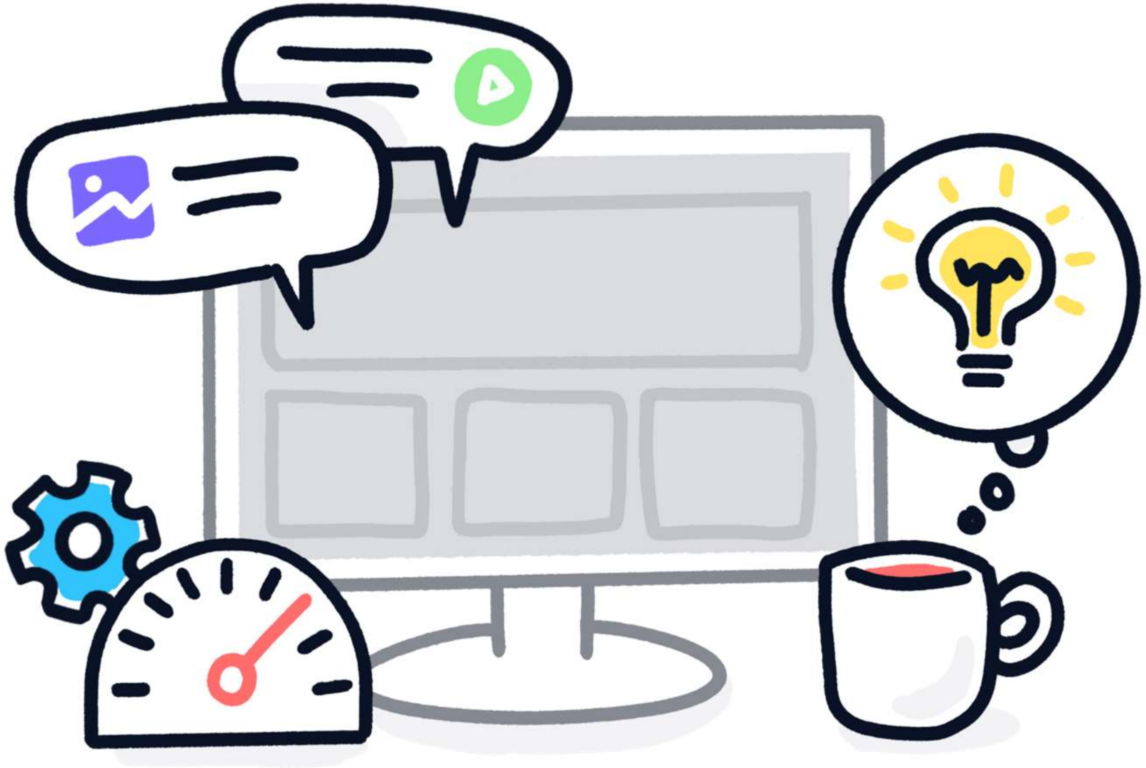
Commit your work



Branding

Learning goals

- Stylesheet (Custom styling) – adding a custom theme to the app
- Custom Navigation Layout – including a sign out button
- Custom login page – where employees can also sign up for the app



Custom Styling: 3 options

1

Use the **Theme Editor** in **Mendix Studio**

2

Use **design properties** to change styling in **Studio Pro**

3

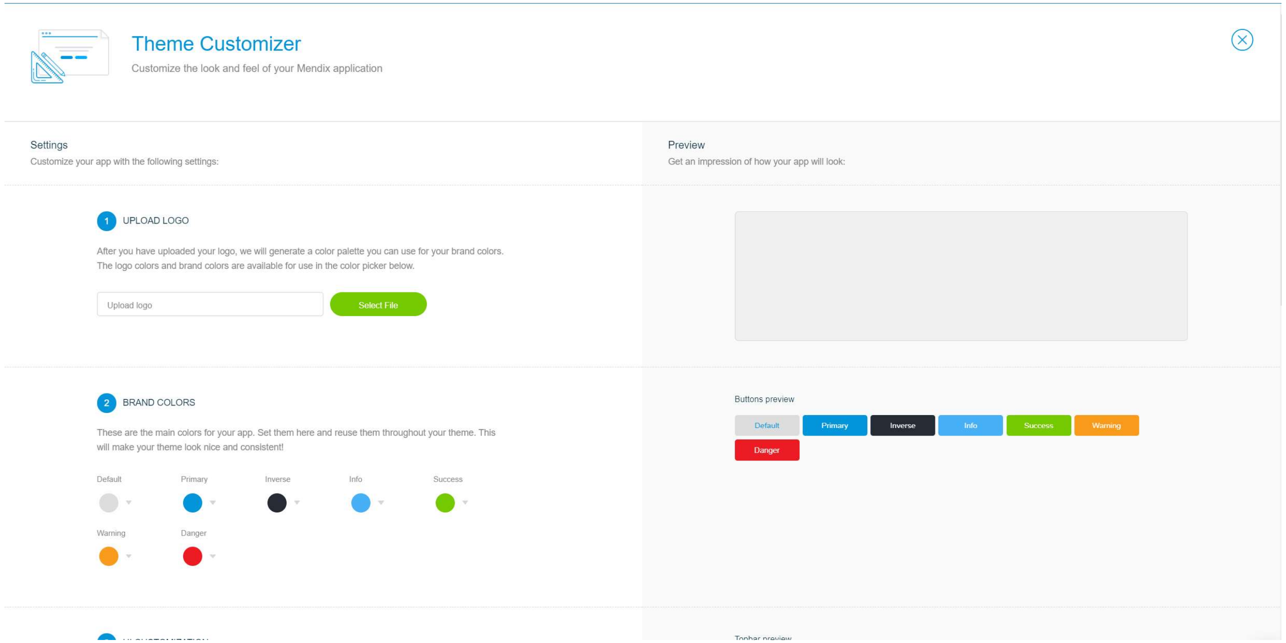
Change **Sass variables**, to change existing styling or add new styling, with **Sass** or **CSS**

Userstory

As a company I want my logo in the app so all my employees know that this is our app

Adding custom styling

- Open the app in Mendix Studio
- Use Mendix Studio to upload the logo
- Go back to Mendix Studio Pro and Update



Theme Customizer

Customize the look and feel of your Mendix application

Settings

Customize your app with the following settings:

Preview

Get an impression of how your app will look:

1 UPLOAD LOGO

After you have uploaded your logo, we will generate a color palette you can use for your brand colors. The logo colors and brand colors are available for use in the color picker below.

Upload logo

Select File

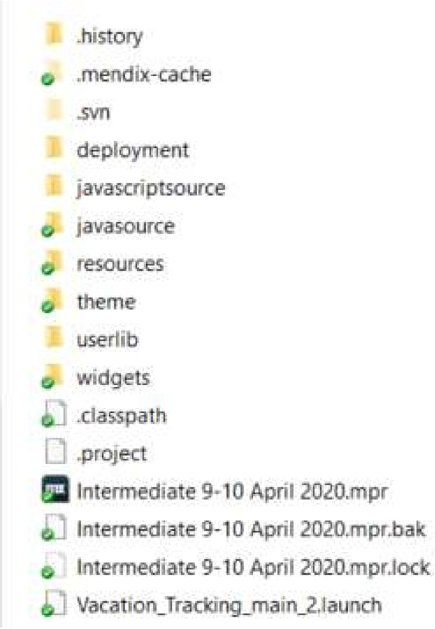
2 BRAND COLORS

These are the main colors for your app. Set them here and reuse them throughout your theme. This will make your theme look nice and consistent!

The Project Directory

Best Practices

- Keep your Project Directory clean!
- Know what you import! (when importing external module, several files could be added to **userlib** and **resources** folder, good to know which ones those are)
- This is because you need to manually remove those files, when removing the external module again. Always do this, to prevent future conflicts!
- When using version management, on commit also check changes to project directory (to prevent accidental changes)

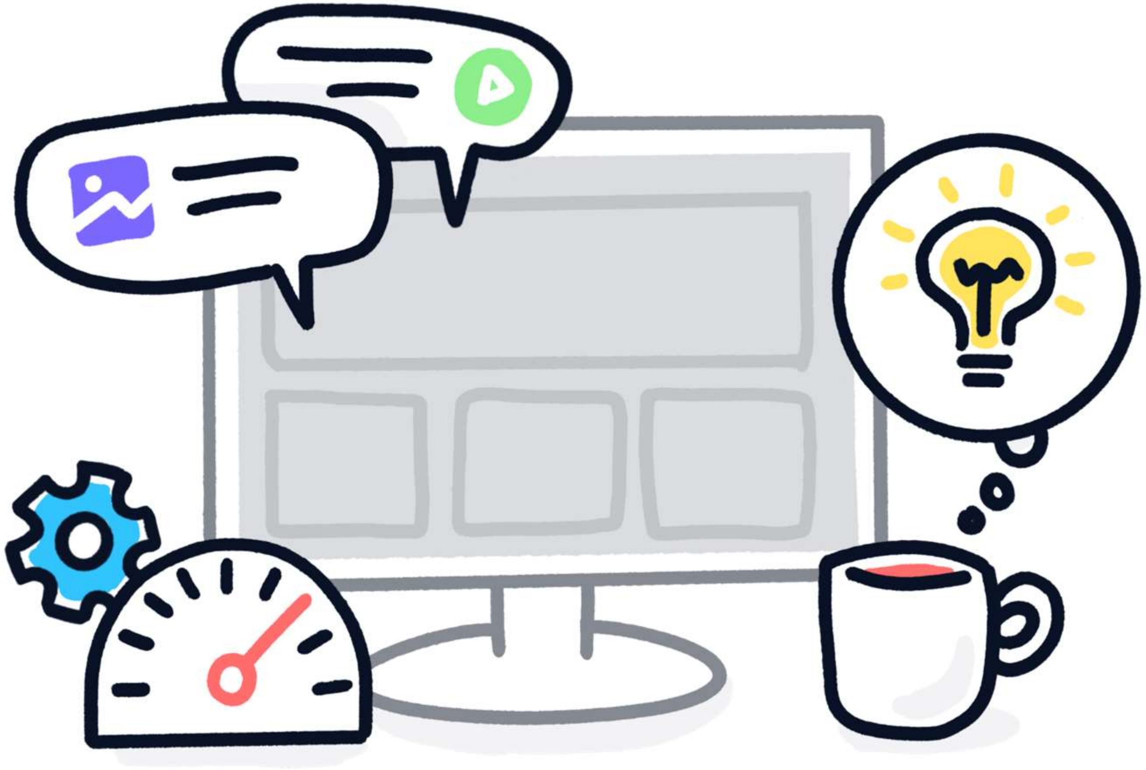


.history
.mendix-cache
.svn
deployment
javascriptsource
javasource
resources
theme
userlib
widgets
.classpath
.project
Intermediate 9-10 April 2020.mpr
Intermediate 9-10 April 2020.mpr.bak
Intermediate 9-10 April 2020.mpr.lock
Vacation_Tracking_main_2.launch

Anonymous users

Learning goals

- What is an anonymous user in Mendix
- What are the benefits and drawbacks
- How do you use an anonymous user in Mendix



Introduction

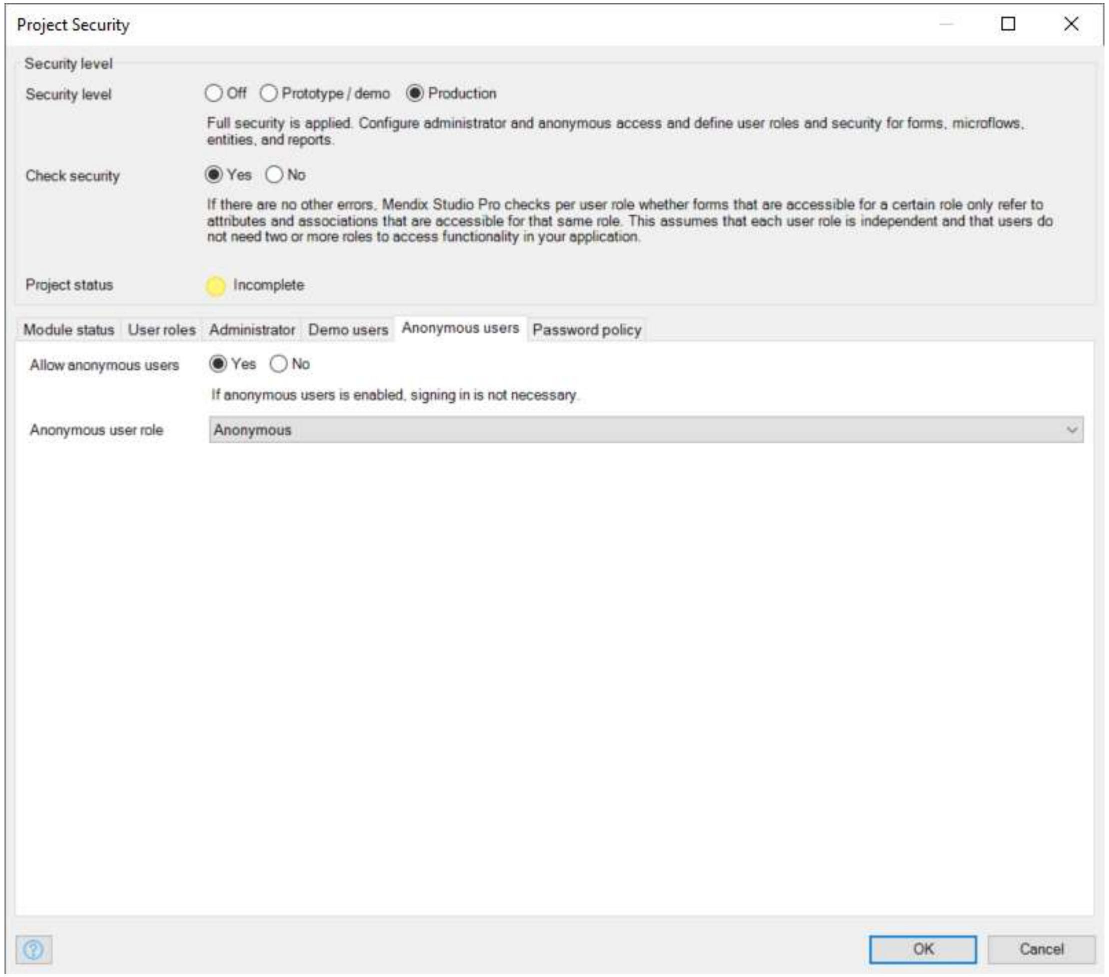
Anonymous users allow people without accounts to have access to a Mendix app

Benefits

- Allows for landing page with dynamic data
- Allows for a custom login page

Drawbacks

- Potential security risk



Security level

Security level ○ Off ○ Prototype / demo ● Production

Full security is applied. Configure administrator and anonymous access and define user roles and security for forms, microflows, entities, and reports.

Check security ● Yes ○ No

If there are no other errors, Mendix Studio Pro checks per user role whether forms that are accessible for a certain role only refer to attributes and associations that are accessible for that same role. This assumes that each user role is independent and that users do not need two or more roles to access functionality in your application.

Project status ● Incomplete

Allow anonymous users ● Yes ○ No

If anonymous users is enabled, signing in is not necessary.

Anonymous user role: Anonymous

Custom login page

- Anonymous users requires a custom login page
  - Can be a Mendix page
  - Can be a custom HTML page

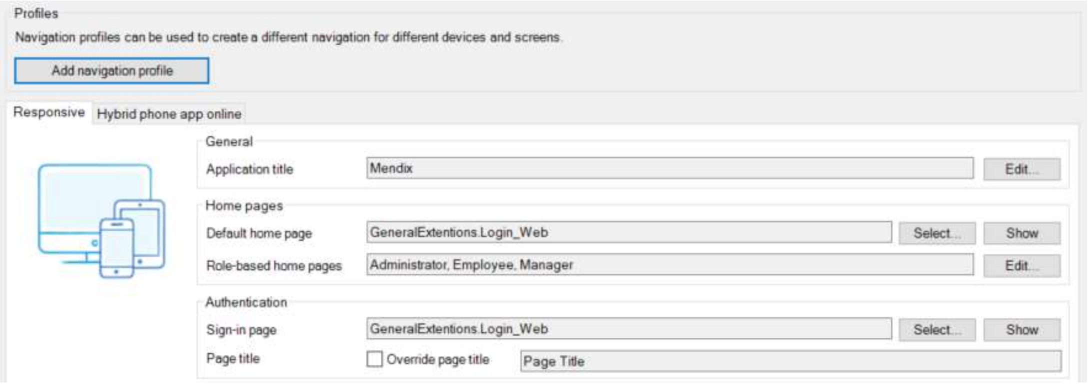
- Custom Mendix login page allows for
  - Access to Mendix pages for anonymous users

- Custom HTML page allows for
  - Advance integration scenario’s (e.g. SSO)

	Mendix page	HTML page
Easy to use	🟩	🟥
HTML knowledge required	🟥	🟩
Allow Anonymous Users	🟩	🟥
Works on Hybrid Mobile	🟩	🟥
Mx loaded after login	🟥	🟩

Custom login page in Mendix

- Default home page is shown to all unauthenticated users
- All other user roles need a role-based homepage
- A sign-in page has to be defined



Profiles

Navigation profiles can be used to create a different navigation for different devices and screens.

General

Application title: Mendix

Home pages

Default home page: GeneralExtentions.Login_Web

Role-based home pages: Administrator, Employee, Manager

Authentication

Sign-in page: GeneralExtentions.Login_Web

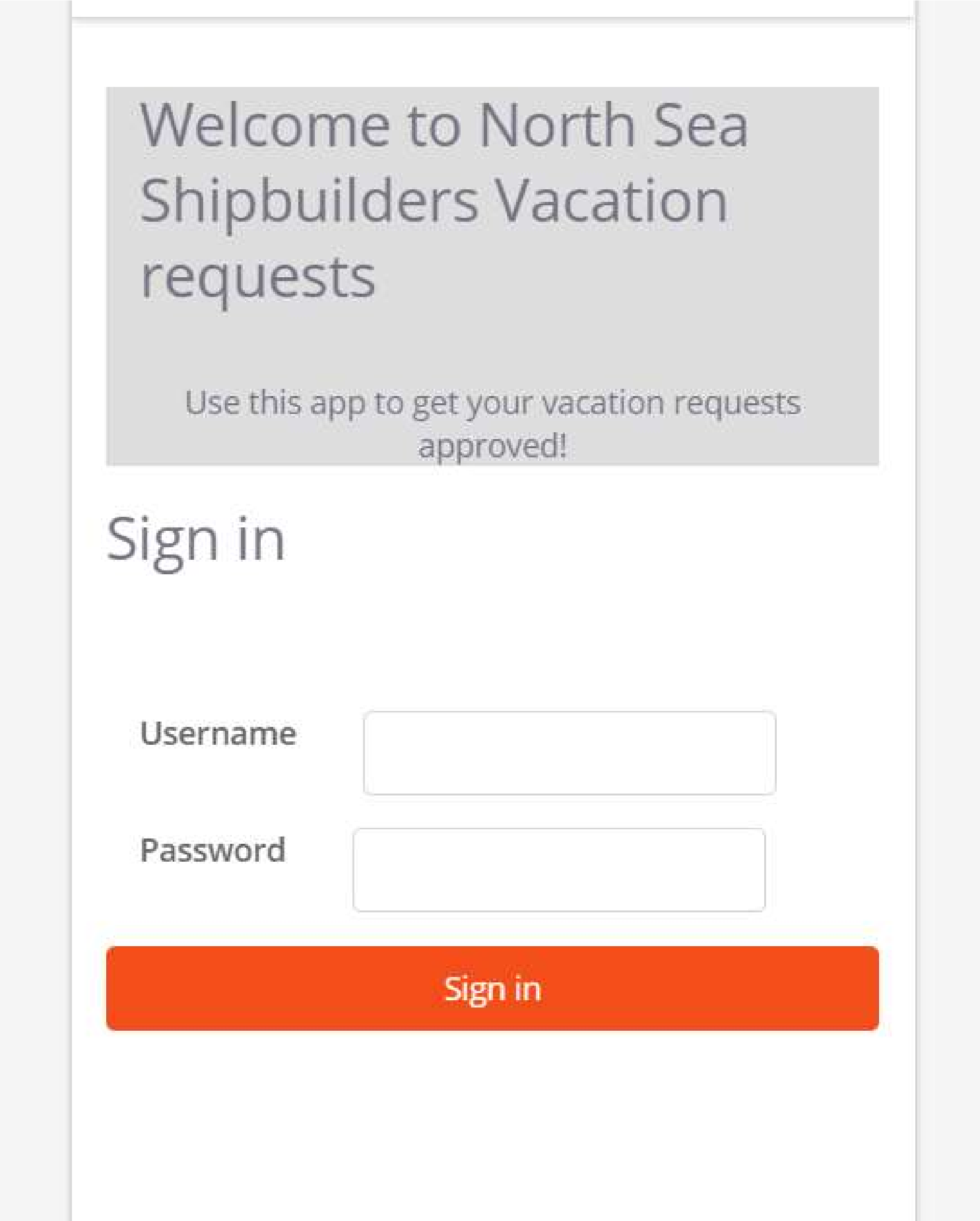
Page title: □ Override page title | Page Title

Userstory

As an administrator I want to allow users to sign-up for the system on their own so I do not have to create all the user accounts myself

Create custom login page

- Create **Anonymous** user role & corresponding module role in **GeneralExtentions** module
- Allow Anonymous users
- Create new login page
- Set the login page as:
  - Default homepage
  - Sign-in page
- Set up rolebased homepages for Administrator, Manager & Employee
- Build out custom login page to match this design



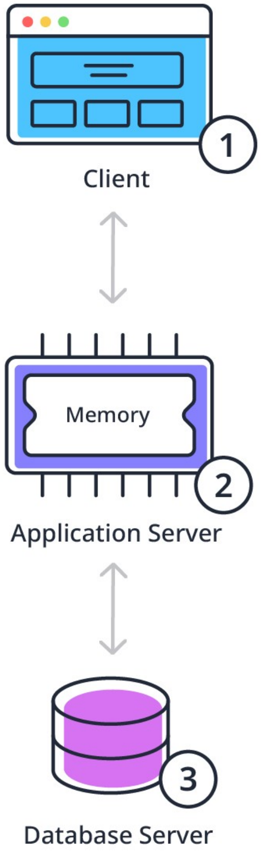
Welcome to North Sea Shipbuilders Vacation requests

Use this app to get your vacation requests approved!

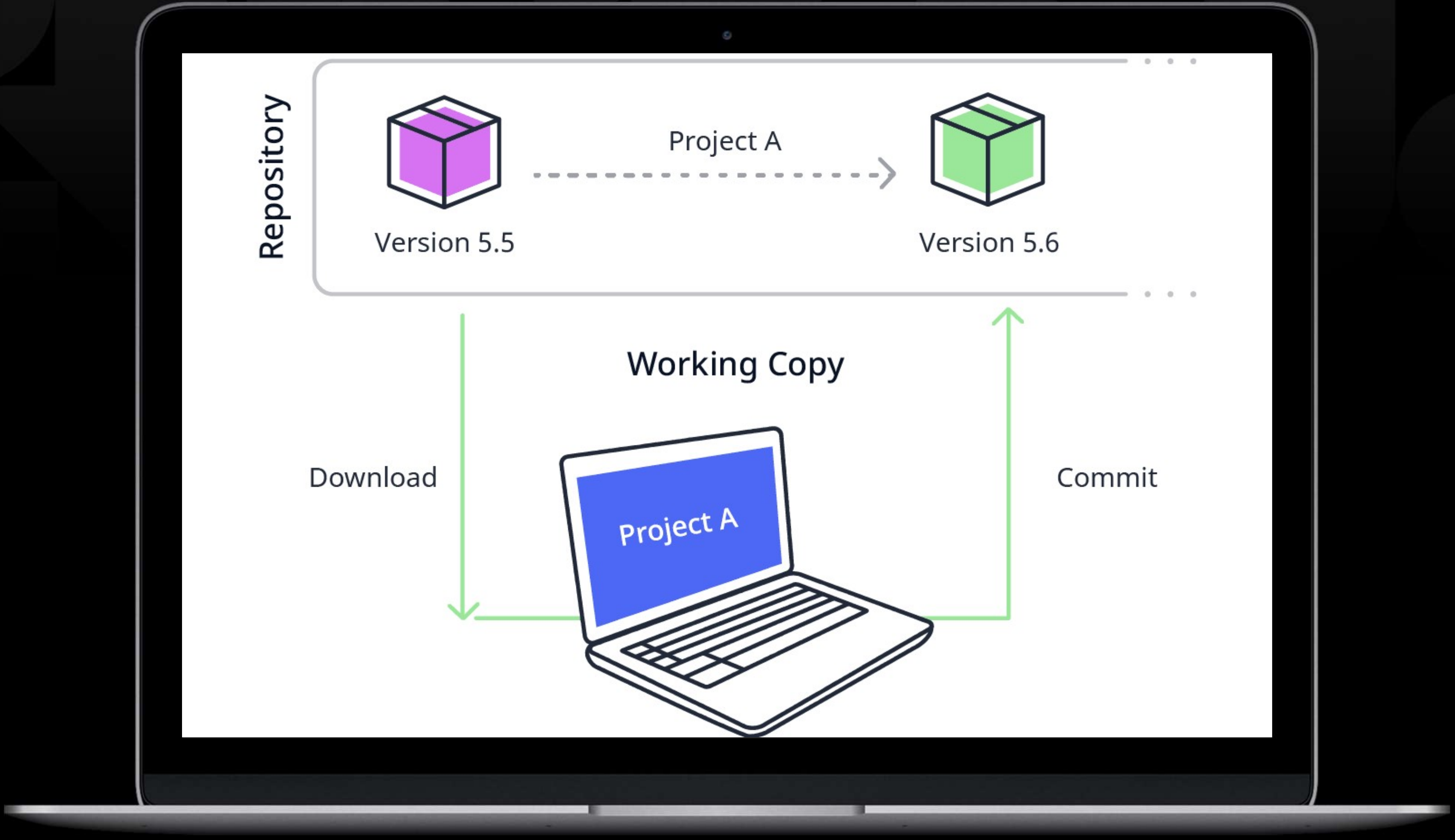
Sign in

Database vs Memory

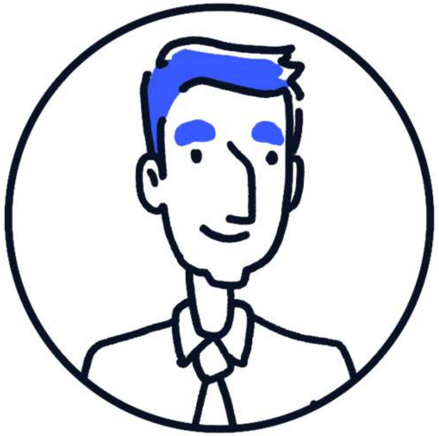
- Persistable and non-persistable
- Transient objects
- Non-persistable assocations (1-1 not possible)
- Other limitations
  - No AutoNumber
  - No validation rules on Domain Model
  - No indexes
- Why use them?



Commit your work



Userstory



As a user I want to be able to sign up for the app so I do not have to go to IT for an account

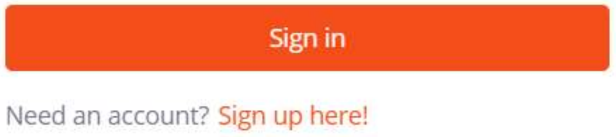
Allow Anonymous users to sign up

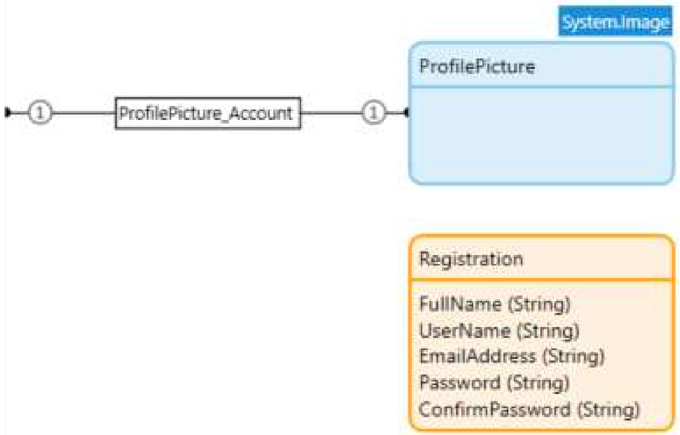
- Add a *Sign up here* section to the login page.

- Extend the Domain Model with a new **Registration** entity

- Create new popup page **Registration_New**
- Make the **Sign up here!** button create a new Registration object and open the page.

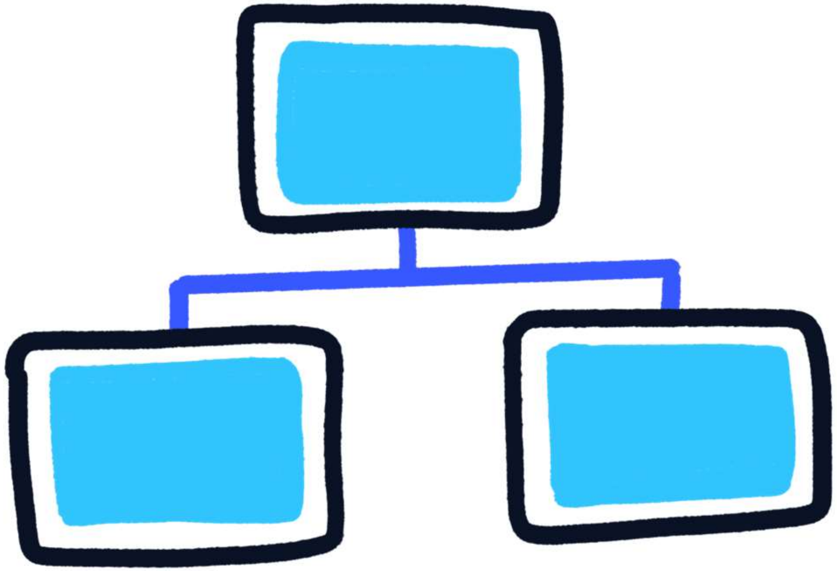
- Setup access rights for Anonymous user (Create & Read, Write)





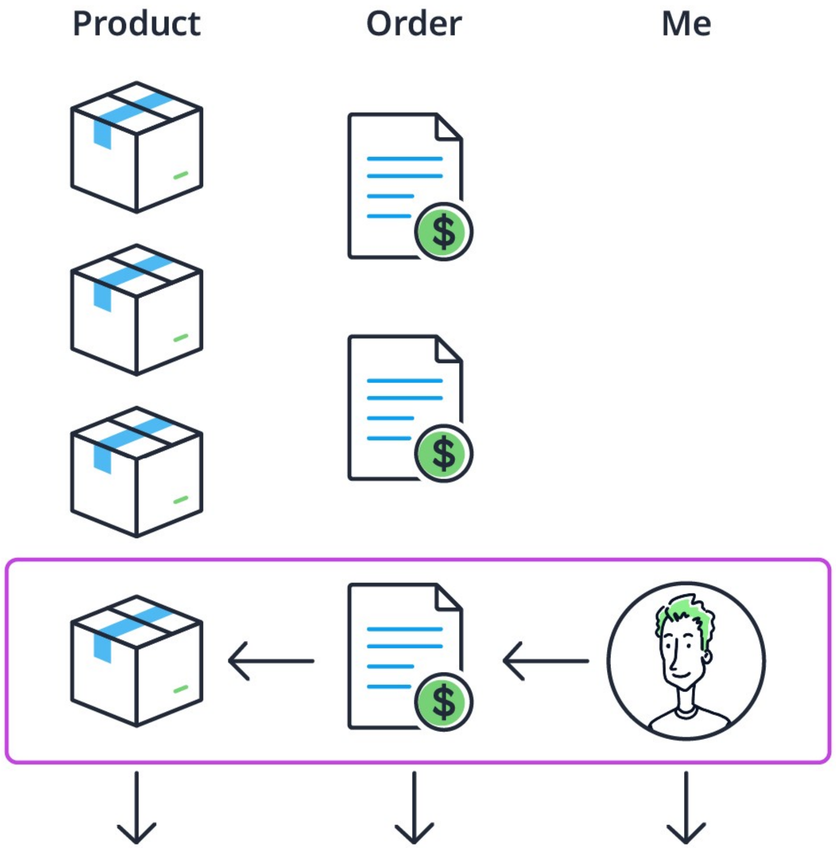
Using more complex constraints

- XPath Keywords & System Variables
  - NULL/empty
  - System variables
  - Time-reated variables
- XPath Constraint Functions



What is an XPath function?

- **String functions:**
  - contains(*{path}*, *{string}*)
  - string-length(*{path}*)
  - ends-with(*{path}* , *{string}*)
- **DateTime functions:**
  - year-from-dateTime(*{path}*)
  - weekday-from-dateTime(*{path}*)
- **Boolean functions**:
  - true()
  - false()



//Product/[contains(Product_Order/Order/Order_Person/Person,Pete)]

What is the Userrole System Variable?

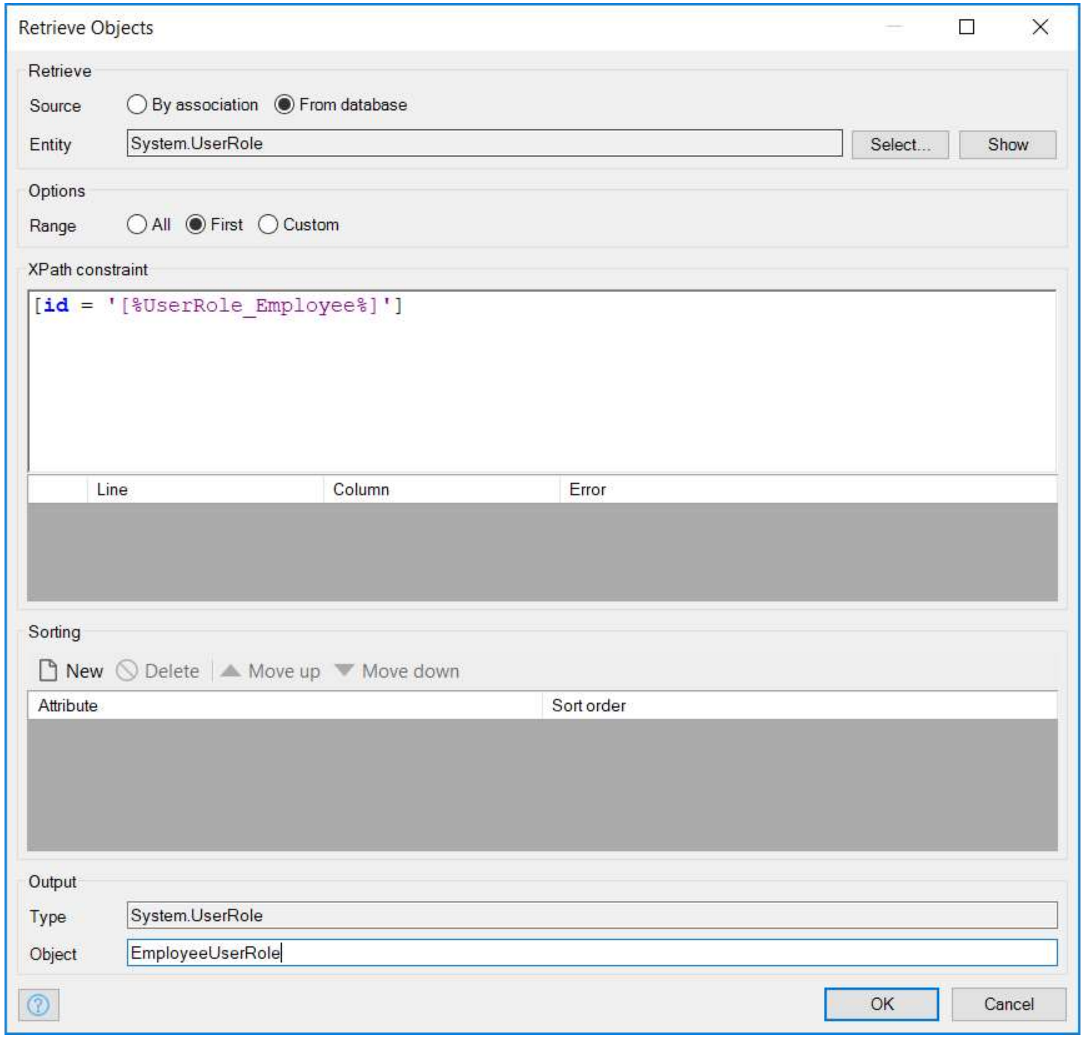
- Automatically created when you create a **User Role** in **Project Security**

- Contains name of the **User Role:** **'**[%UserRole_Employee%]’

- Appears in auto-complete when XPath ends in System module association System.UserRoles

Create Account for Anonymous user

- Make **Create my Account** button **Call a microflow**
- Create new microflow, and give Anonymous user access to it
- In the microflow:
  - Make sure all fields are filled out
  - Make sure the passwords match
  - Create a new **Account** object and pass in the data from the **Registration** object
  - Set the UserRole to Employee
  - Commit and close the page



Retrieve Objects

Retrieve

Source ○ By association ● From database

Entity: System.UserRole

Options

Range ○ All ● First ○ Custom

XPath constraint

```
[id = '[%UserRole_Employee%]']
```

Line	Column	Error

Sorting

Attribute	Sort order

Output

Type: System.UserRole

Object: EmployeeUserRole

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Sub microflows

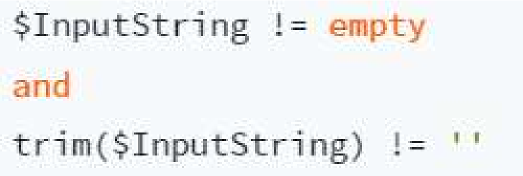
- Improve readability and maintainability
- Analyze usage (dependencies and input parameters)
- Sub Microflows and security (parent MF dictates access)

Notes on submicroflows:

- Impossible to extract:
  - start events
  - end events
  - input parameters
- Don’t overdo it!
- Changing primitive input parameters

Validating string inputs

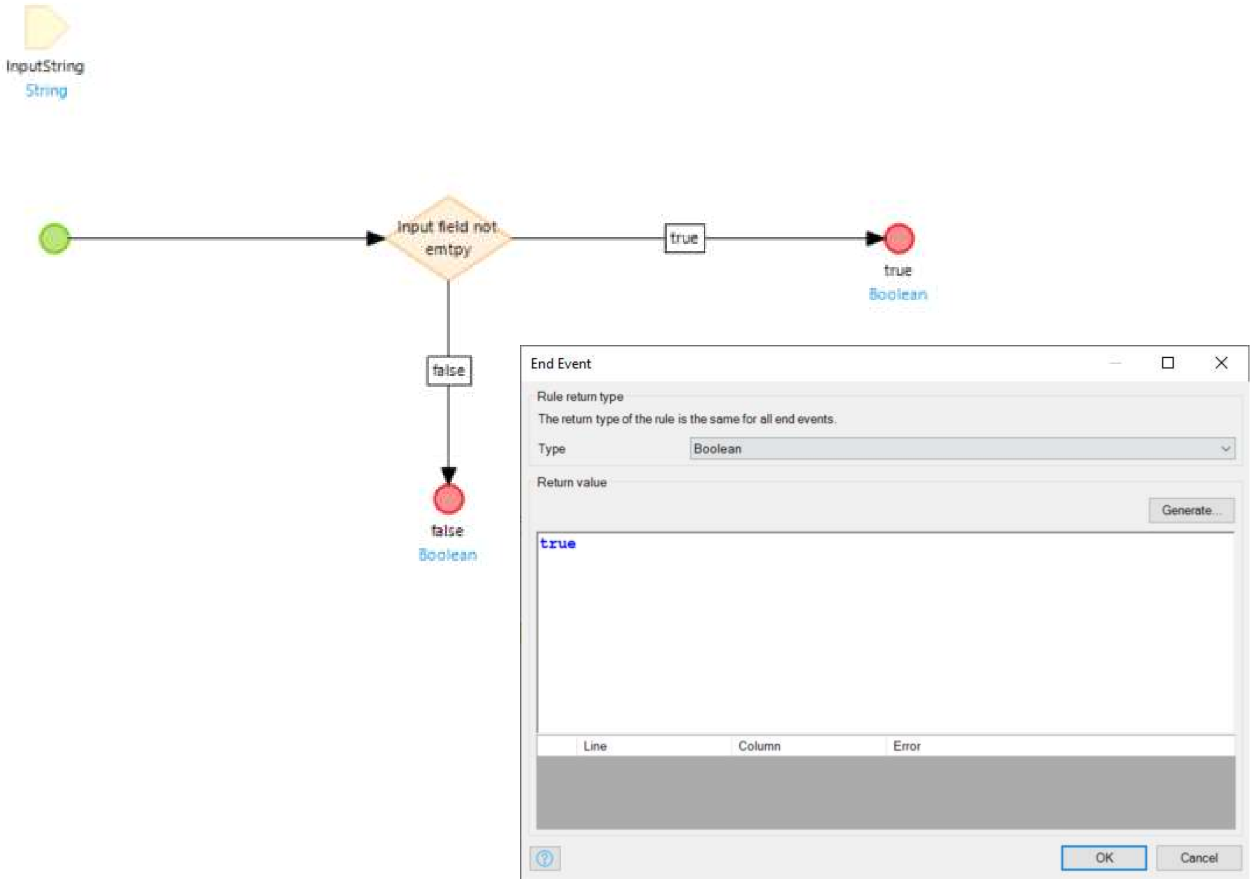
- $InputString != empty doesn't cover it!
- empty != ''
- Correct way of checking empty string:



```
$InputString != empty
and
trim($InputString) != ''
```

Rules

- Similar to a microflow
- Evaluate data
- Can only be used in a decision
- Should always return a Boolean
- Cannot change data
- Cannot interact with the client
- Cannot call webservices



End Event

Rule return type

The return type of the rule is the same for all end events.

Type: Boolean

Return value

```
true
```

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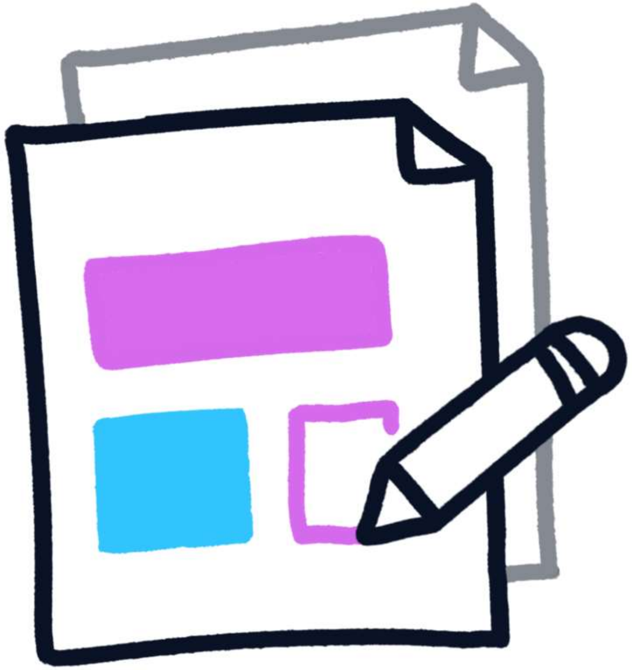
Extract submicroflow

- Extract validation logic as a submicroflow
- Create reusable rule to check for empty strings
- Use it in the validation microflow
- Deploy and test your functionality

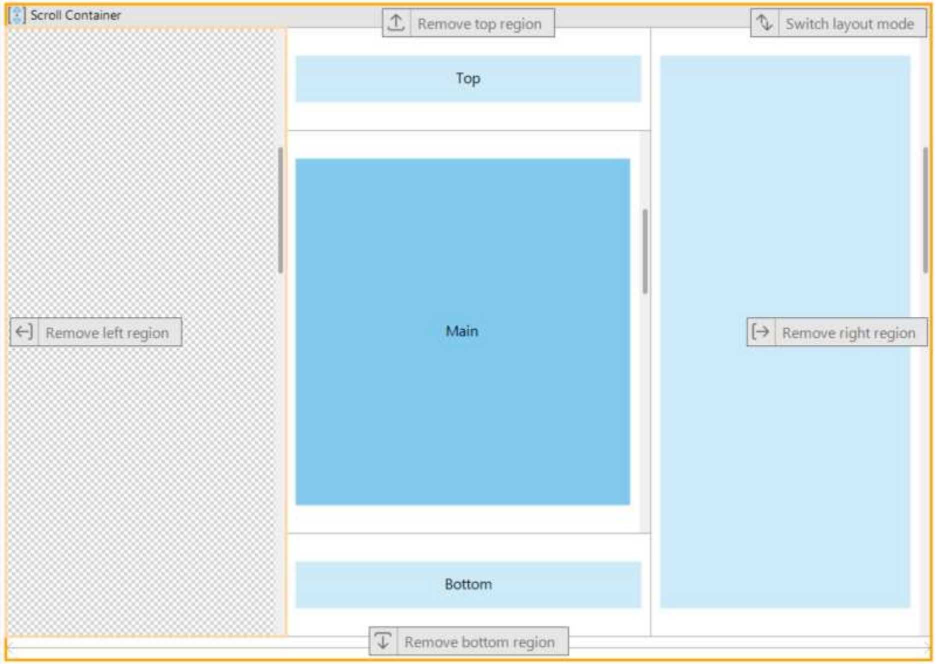
Layouts

- What are layouts?
- Why do we use them?
- Default options
  - Atlas Default
  - Atlas Topbar
  - Popup



Layouts: Scroll container

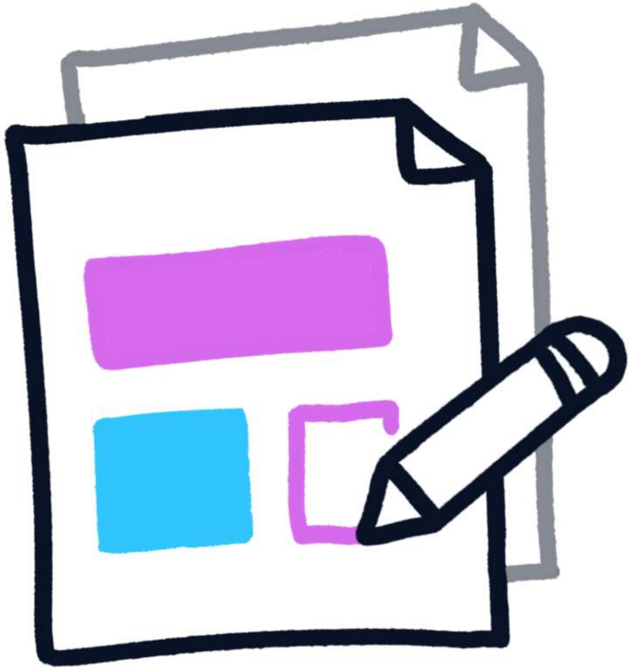
- Divide the layout in individual regions
- Set size of these regions
- Set toggle mode of these regions
- **Contents** → present on every page that uses that layout
- **Placeholders** → where the page content will be placed



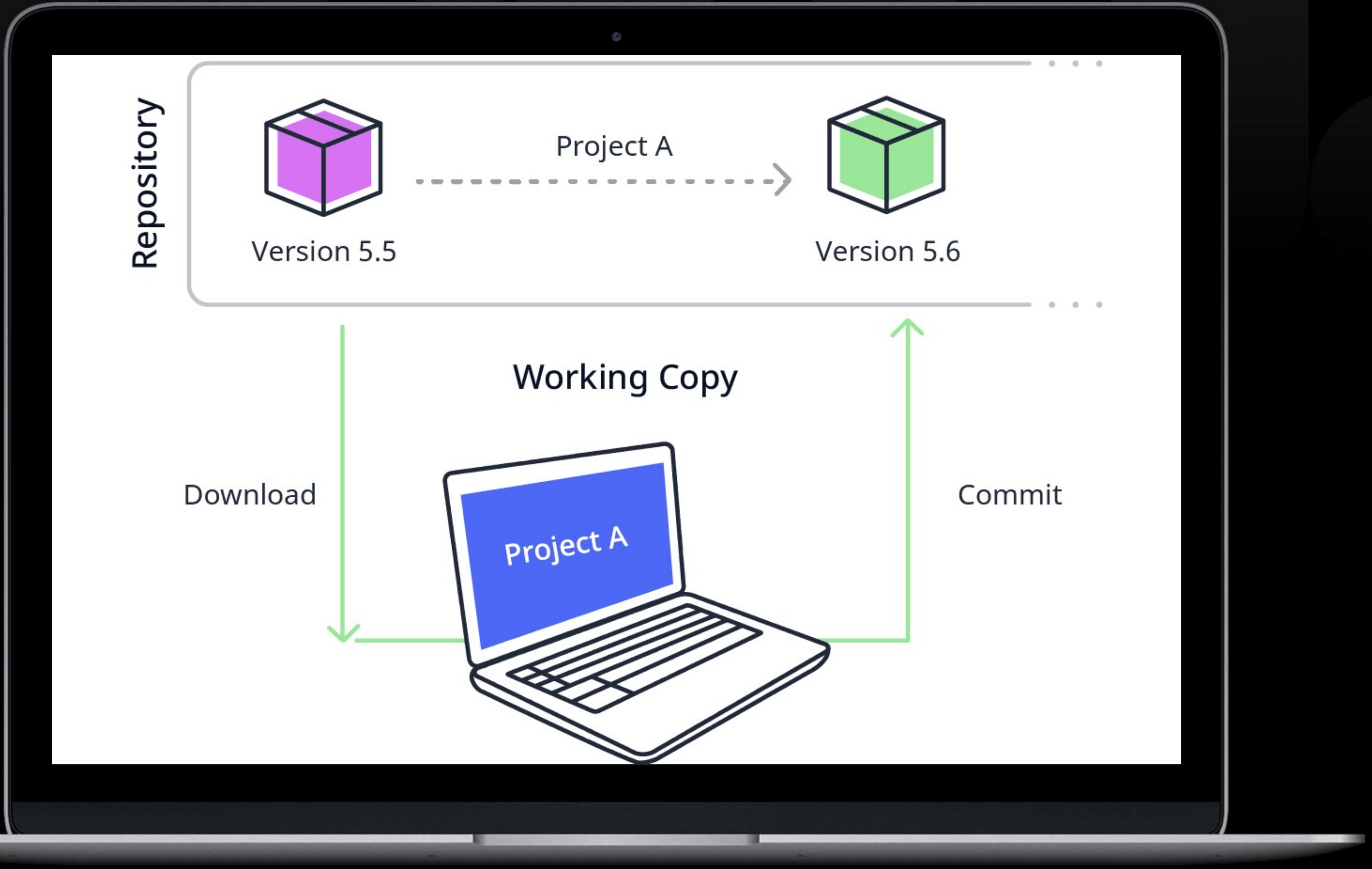
Layouts: Master layout

- Layout can be based on other layouts
- Use placeholders in Master to create specialized configuration
- Don't forget to add new placeholders for the page!

- DRY (Don’t Repeat Yourself)
- Increase productivity & maintainability
- Best practice: maximum 3 levels



Commit your work



Repository

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Userstory

As a company I want to allow users to login to our app without exposing functionality to the world

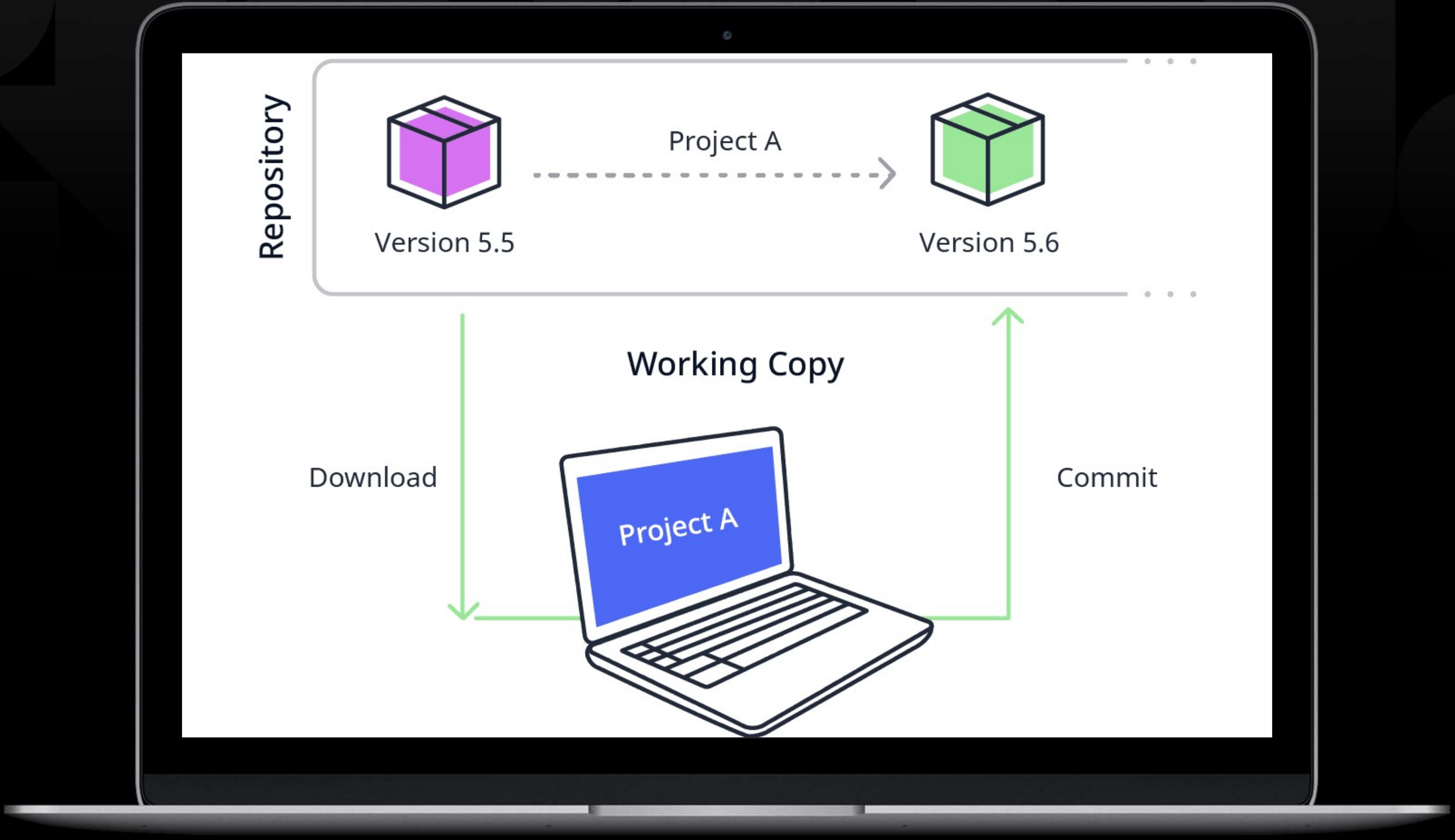
Using and creating navigation layouts

- For the **Home** page, change the navigation layout to **Atlas_TopBar**

- For the custom login page, create a new navigation layout **Atlas_Login**
    - The navigation layout should only contain the **Main** placeholder
    - Place this navigation layout in:

      App Store Modules > Atlas_UI_Resources > _Layouts > Responsive

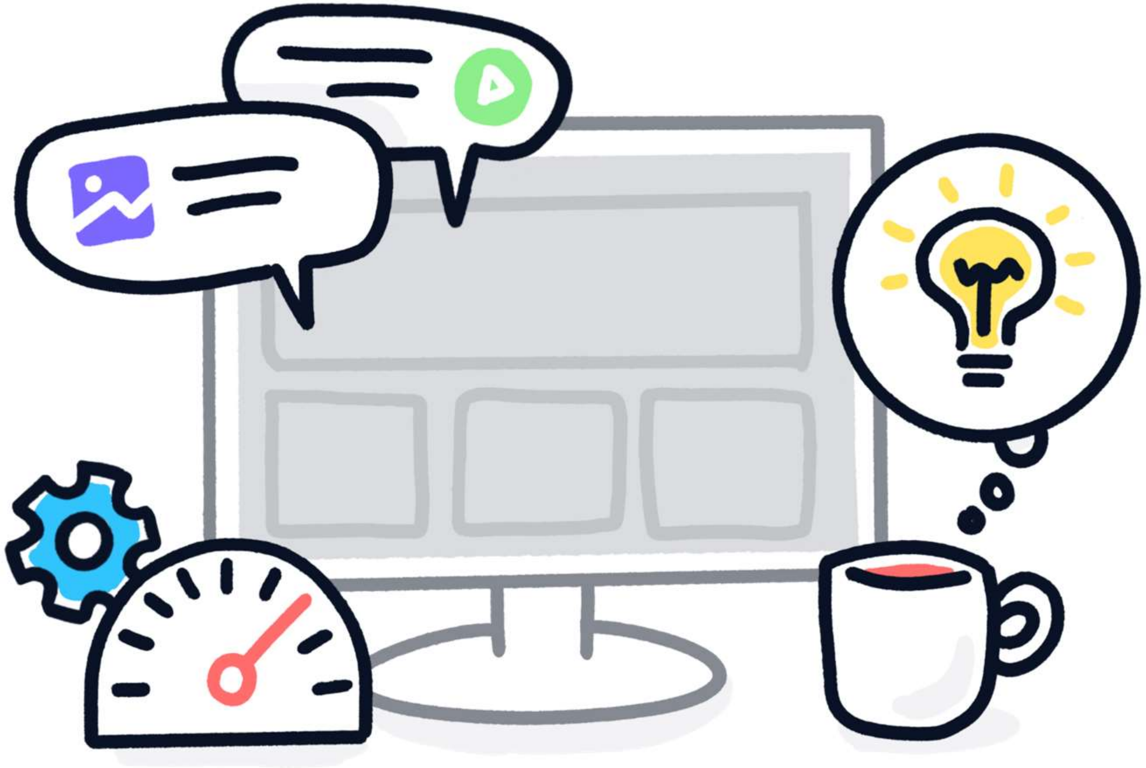
Commit your work



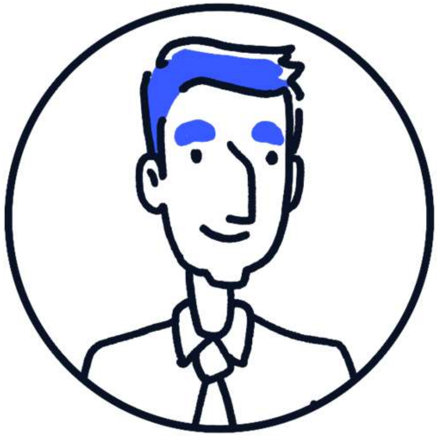
Adding requests

Learning goals

- How to use enumerations in Mendix
- Why you want to create mulitple associations between two entities
- What XPath is and how you can apply it
- How to create a wizard in Mendix
- How to setup a calculated attribute



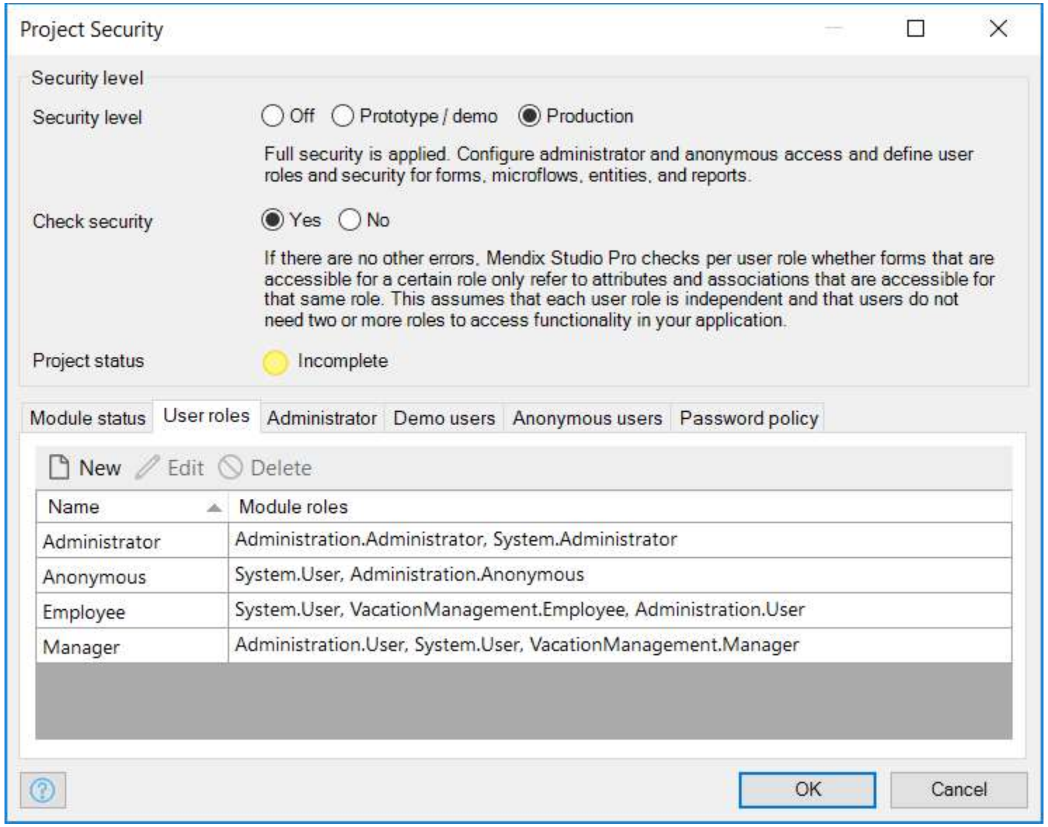
Userstory



As a user I want to add vacation requests so I can go on vacation

Configure MyFirstModule

- Rename **MyFirstModule** to **VacationManagement**
- Make sure you have the following module roles:
  - Employee
  - Manager
- Change the User module role to Administrator
- Connect the module roles to the corresponding user roles
- Give every module role access to the Home page.



Security level

Security level: ○ Off ○ Prototype / demo ● Production

Full security is applied. Configure administrator and anonymous access and define user roles and security for forms, microflows, entities, and reports.

Check security: ● Yes ○ No

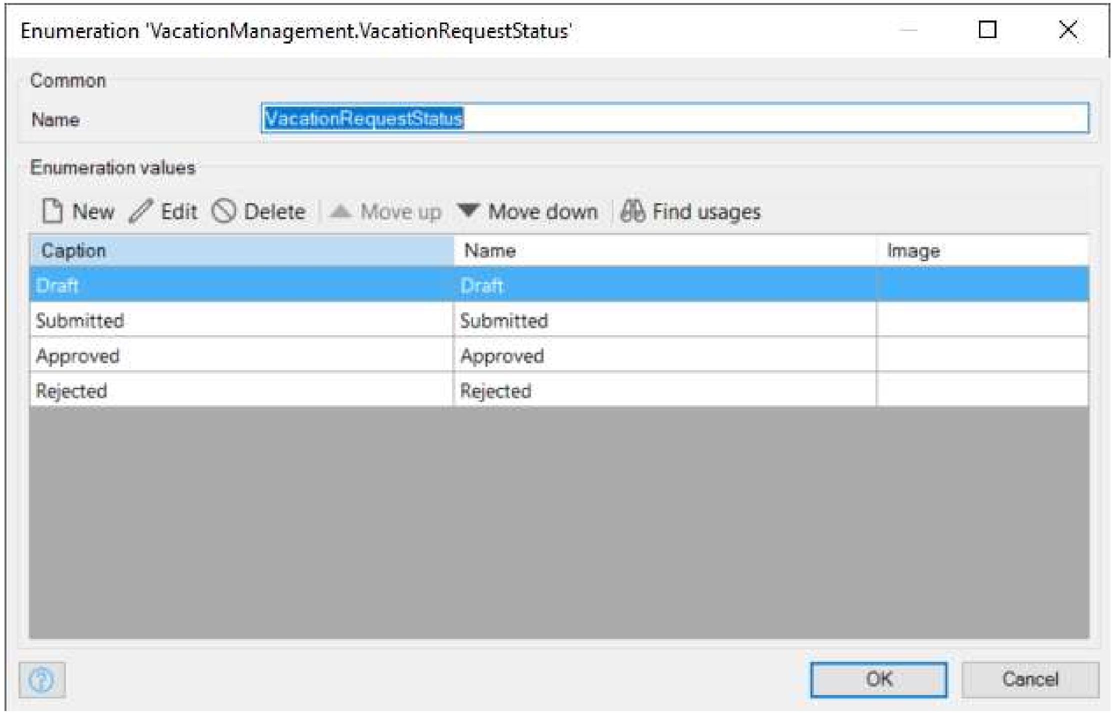
If there are no other errors, Mendix Studio Pro checks per user role whether forms that are accessible for a certain role only refer to attributes and associations that are accessible for that same role. This assumes that each user role is independent and that users do not need two or more roles to access functionality in your application.

Project status: ● Incomplete

Name	Module roles
Administrator	Administration.Administrator, System.Administrator
Anonymous	System.User, Administration.Anonymous
Employee	System.User, VacationManagement.Employee, Administration.User
Manager	Administration.User, System.User, VacationManagement.Manager

What is an Enumeration Value?

- Pre-defined list of string values
- Can be selected in a dropdown or from radio button
- Can be used to constrain data



Enumeration 'VacationManagement.VacationRequestStatus'

Common

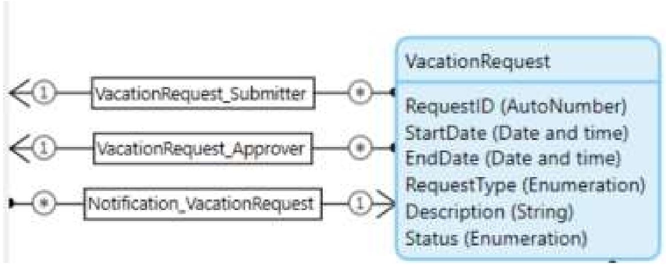
Name: VacationRequestStatus

Enumeration values

Caption	Name	Image
Draft	Draft	
Submitted	Submitted	
Approved	Approved	
Rejected	Rejected	

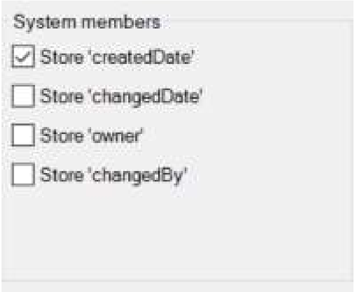
Multiple associations between entities

- Different relations between instances of entities
- How does the user want to see and manipulate data?



System Members

- createdDate
- changedDate
- owner
- changedBy



System members

☑ Store 'createdDate'

☐ Store 'changedDate'

☐ Store 'owner'

☐ Store 'changedBy'

How do we store a vacation request?

- Start-date and end-date
- Type of request
- Status of the request
- Description
- Number of hours
  - Number of hours per day
  - We need a VacationRequestDay entity!

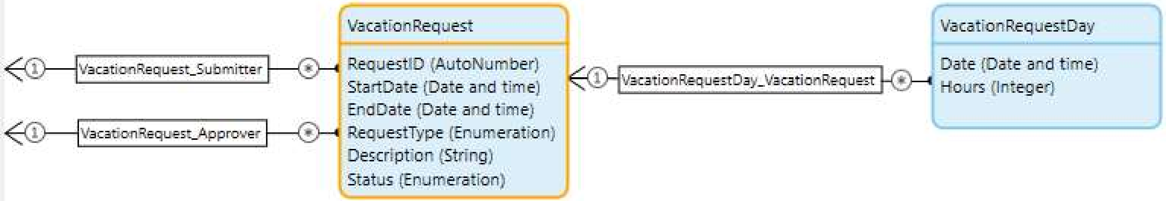
Adding requests: extend Domain Model

- Add **VacationRequest** entity
  - Add attributes
  - Store **‘createdDate’** system member

- Add **VacationRequestType** enumeration:
  - Annual Holiday Paid/Paid Time Off (PTO)
  - Special Leave
  - Parental Leave
  - Unpaid

- Add **VacationRequestStatus** enumeration:
  - Draft
  - Submitted
  - Approved
  - Rejected

- Add cross module associations to **Account** entity
- Configure access rights (employees should only see their own requests)



VacationRequest

RequestID (AutoNumber)
StartDate (Date and time)
EndDate (Date and time)
RequestType (Enumeration)
Description (String)
Status (Enumeration)

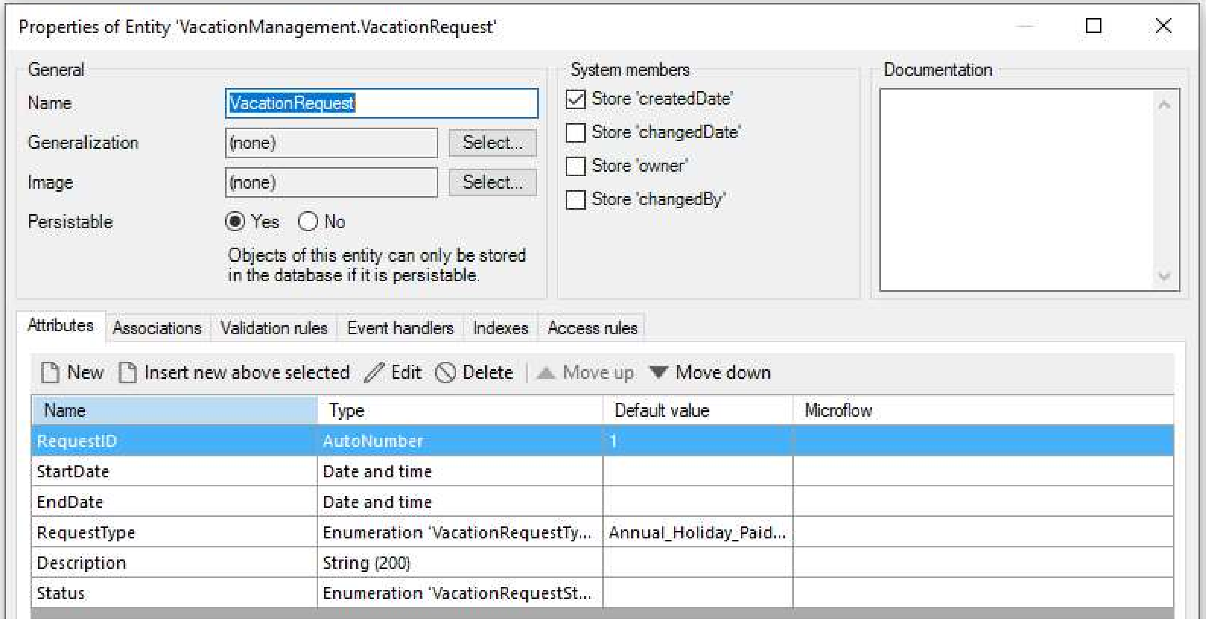
VacationRequestDay

Date (Date and time)
Hours (Integer)

VacationRequest_Submitter

VacationRequest_Approver

VacationRequestDay_VacationRequest



Properties of Entity 'VacationManagement.VacationRequest'

General

Name	VacationRequest
Generalization	(none) Select...
Image	(none) Select...
Persistable	● Yes ○ No

Objects of this entity can only be stored in the database if it is persistable.

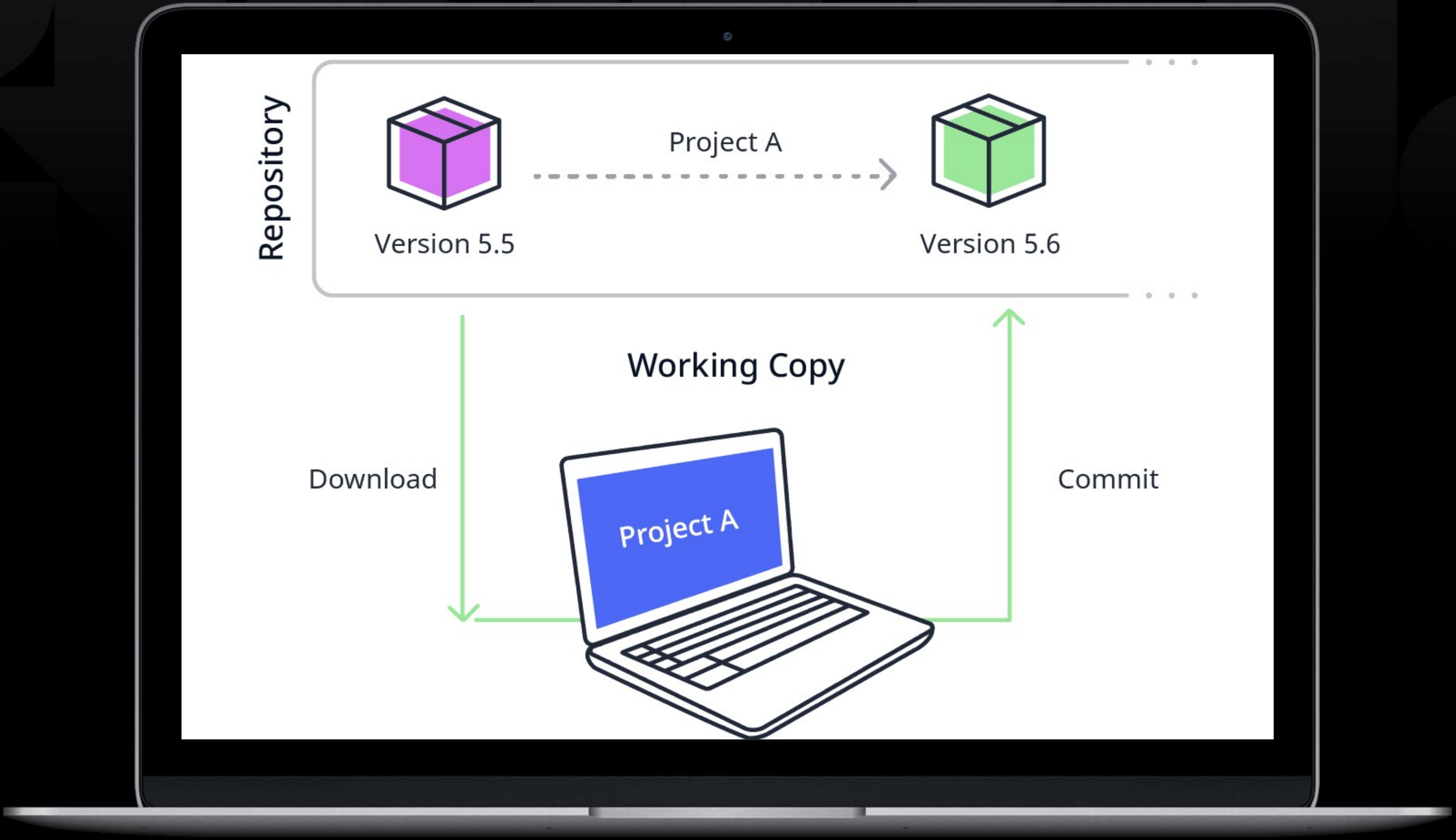
System members

☑ Store 'createdDate'
□ Store 'changedDate'
□ Store 'owner'
□ Store 'changedBy'

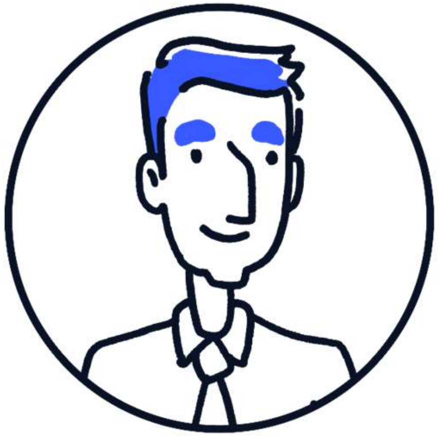
Documentation

Name	Type	Default value	Microflow
RequestID	AutoNumber	1	
StartDate	Date and time		
EndDate	Date and time		
RequestType	Enumeration 'VacationRequestTy...	Annual_Holiday_Paid...	
Description	String (200)		
Status	Enumeration 'VacationRequestSt...		

Commit your work



Userstory

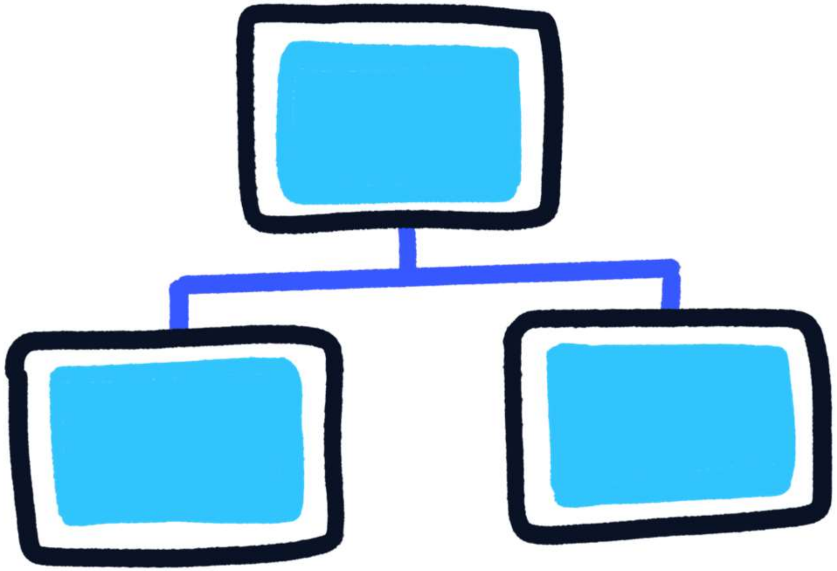


As a user I want to see my upcoming vacation and my new requests on my homepage so I have an overview of all relevant requests

Using more complex constraints

- XPath Keywords & System Variables
  - NULL/empty
  - System variables
  - Time-reated variables
- XPath Constraint Functions
- XPath Operators

=	Equal to
!=	Not equal to
<	Less then
<=	Less then or equal to
>	More then
>=	More then or equal to
or	Or
and	And



What is an XPath operator?

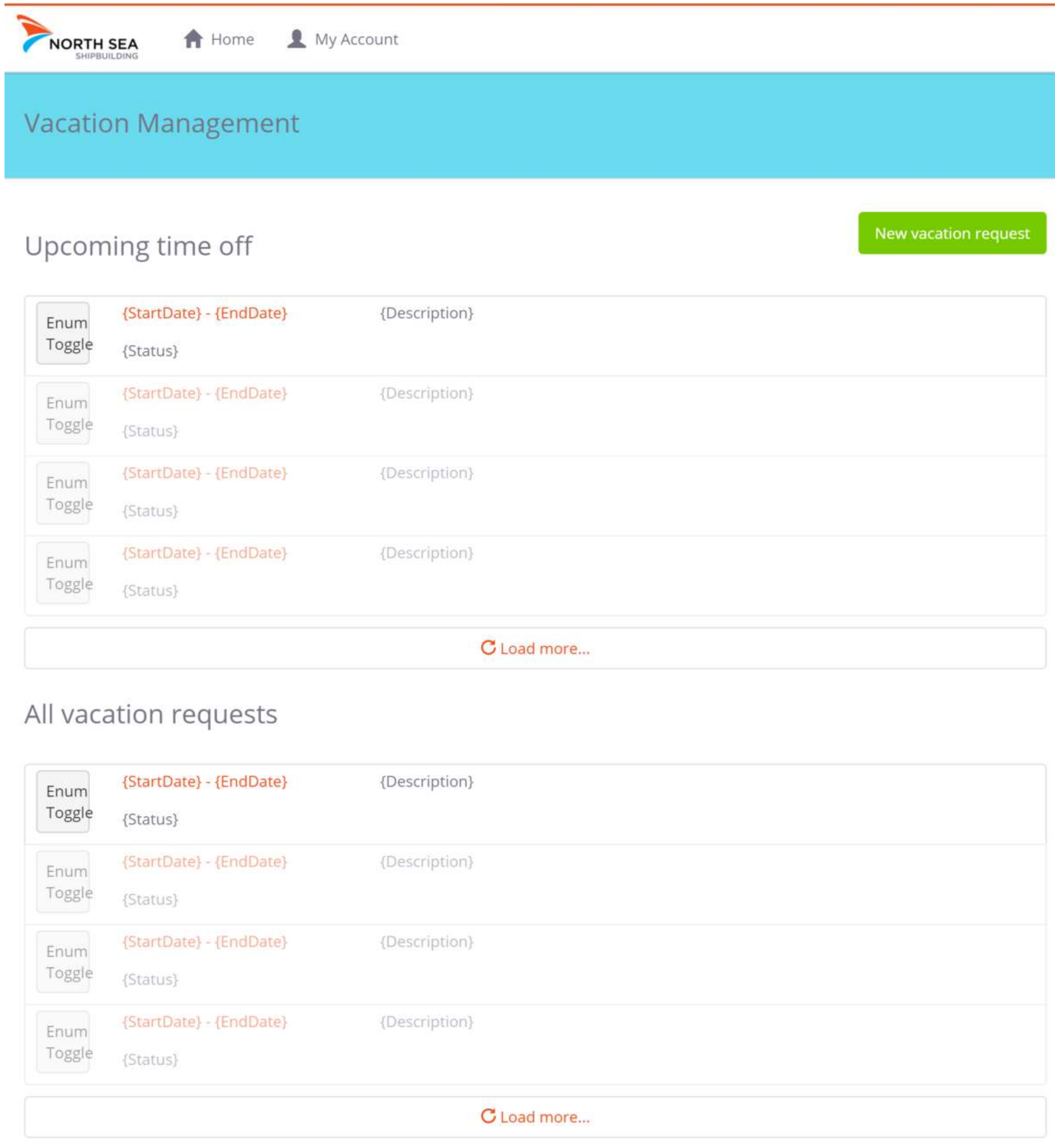
=	Equal to	price = 9.80
!=	Not equal to	price != 9.80
<	Less than	price < 9.80
<=	Less than or equal to	price <= 9.80
>	Greater than	price > 9.80
>=	Greater than or equal to	price >= 9.80
or	Or	price = 9.80 or price = 9.70
and	And	price = 9.80 and amount = 1

Adding requests: Home page

- Add a second **row** to the **layout grid**

- Add two **list views** (one in each row) and connect them to the **VacationRequest** entity
- In the first list view, only show the first 4 upcoming requests

- Add a **New vacation request** button, set the on-click action to **Do nothing** for now



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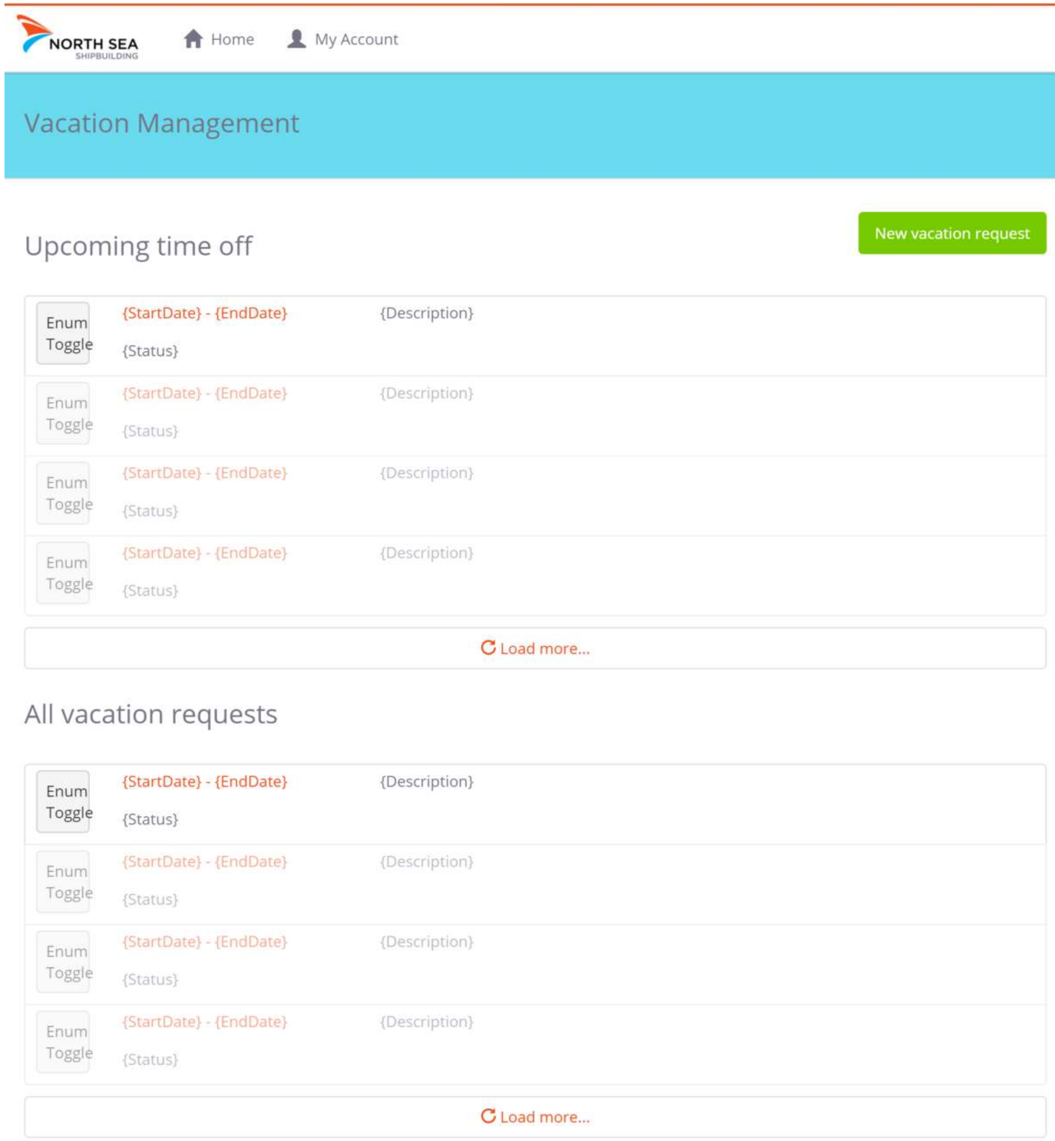
Adding requests: Home page

- Download the **Enum Toggle** widget from the appstore
- Add an image collection **VacationRequestTypeImages** and add the icons

- Match the design



Vacation Management

Upcoming time off

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

All vacation requests

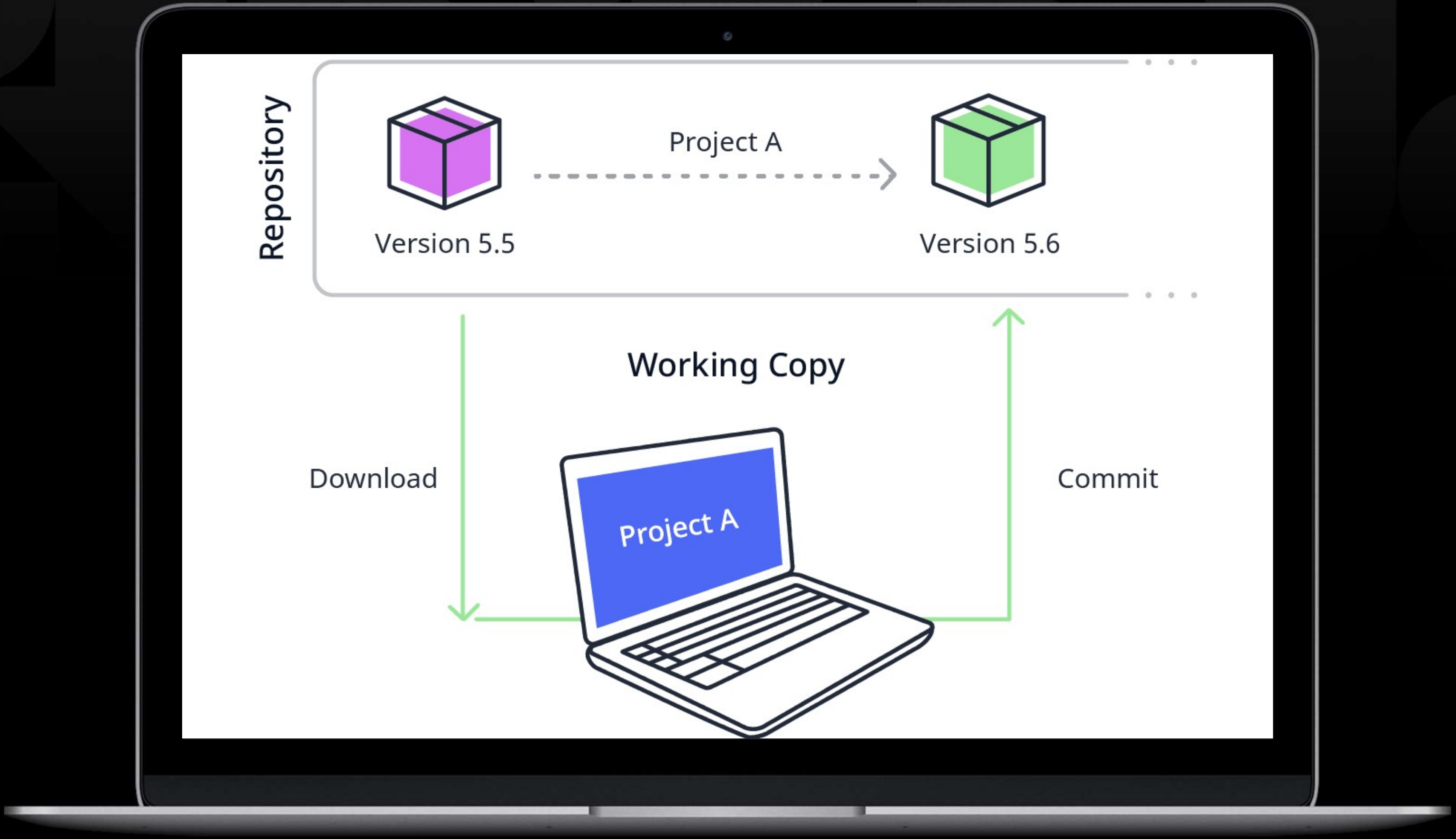
Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Enum Toggle {StartDate} - {EndDate} {Description}
{Status}

Commit your work



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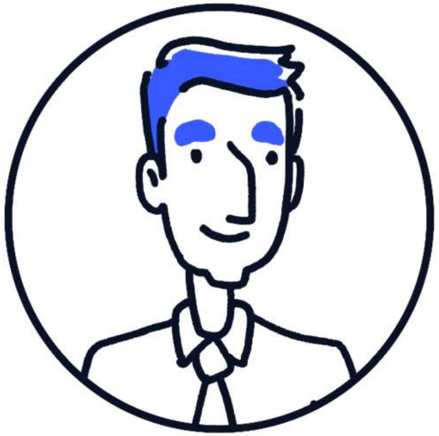


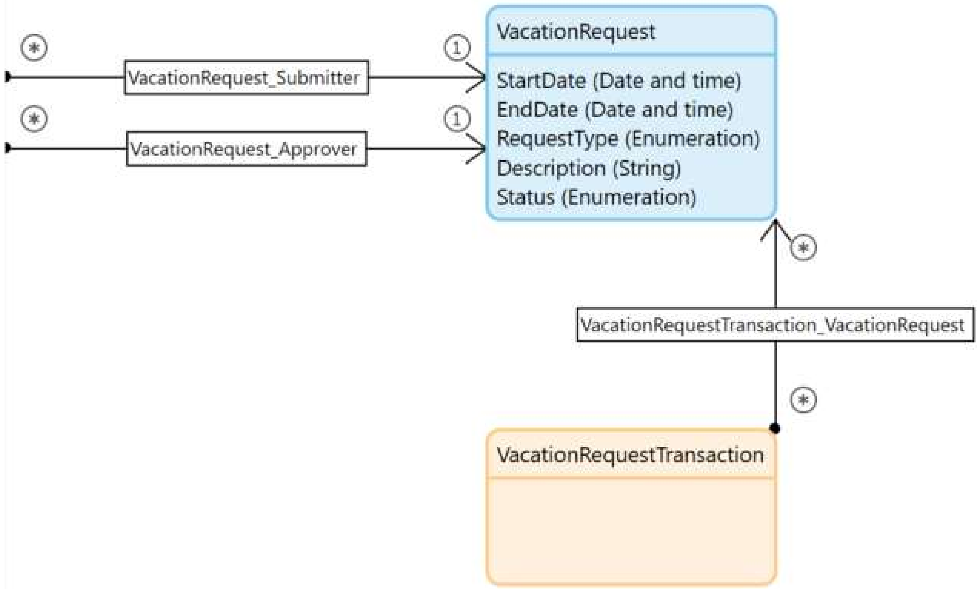
As a user I want to be able to bundle several time-off requests so I can ask time off for several timeframes

The Wizard page template

- Each step is a separate page
- Configure progress bar at the top to show which step of the wizard it is
- Think about transaction

Adding requests

- Extend Domain Model with a new non-persistable entity **VacationRequestTransaction**
- Create a * - * association from **VacationRequestTransaction** to **VacationRequest**
- Employee has **Create** and **Read, Write** access


*
VacationRequest_Submitter
1
*
VacationRequest_Approver
1
VacationRequest
StartDate (Date and time)
EndDate (Date and time)
RequestType (Enumeration)
Description (String)
Status (Enumeration)
*
VacationRequestTransaction_VacationRequest
*
VacationRequestTransaction

Building out the request wizard

Let’s build out our request wizard with a datagrid:

- Ability to add a request
- Ability to edit a single request
- Ability to delete one or multiple requests

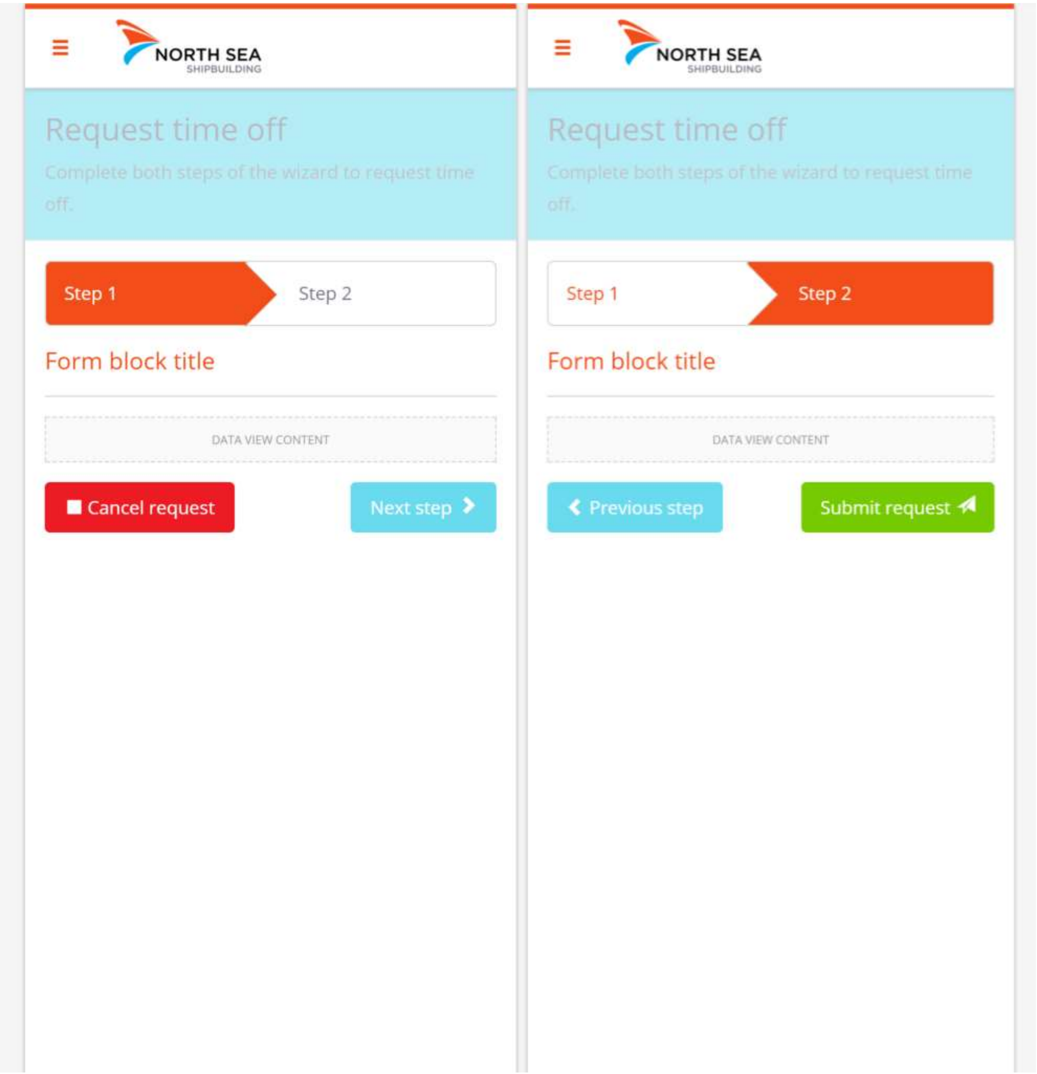
Single and Multi-Select on a Data Grid

- Data Grids can support multi-select
- Default Edit & Delete buttons will not work
- How to fix this?

Adding requests

- Create two new pages: **VacationRequest_Wizard_Step1** & **VacationRequest_Wizard_Step2**
  - Atlas_TopBar
  - Wizard Progress

- Create a snippet **WizardHeader** from one of the headers, and add some nice text to it



NORTH SEA SHIPBUILDING

Request time off

Complete both steps of the wizard to request time off.

Step 1 | Step 2

Form block title

DATA VIEW CONTENT

Cancel request | Next step

NORTH SEA SHIPBUILDING

Request time off

Complete both steps of the wizard to request time off.

Step 1 | Step 2

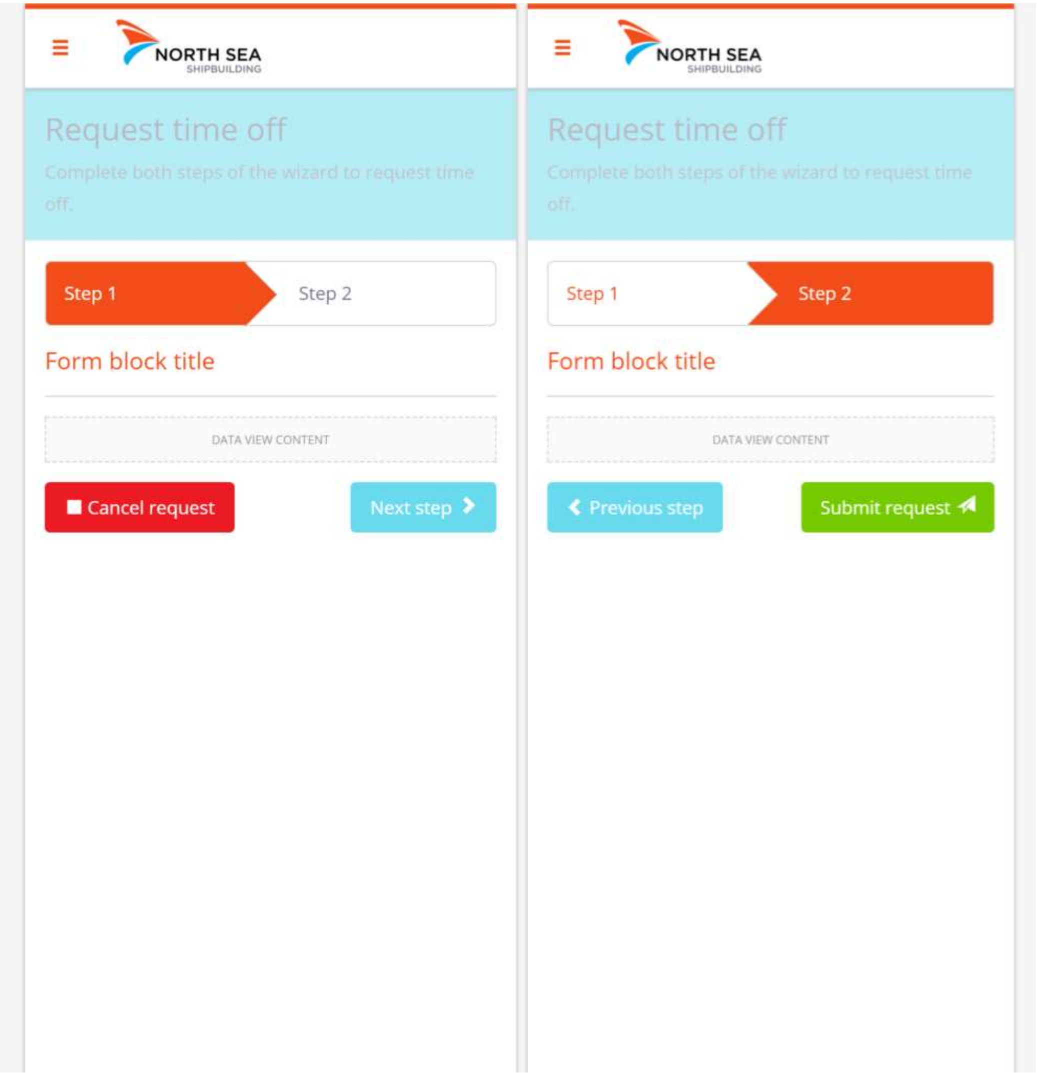
Form block title

DATA VIEW CONTENT

Previous step | Submit request

Adding requests

- On each page:
  - Give **Employee** access
  - Replace the header with the snippet **WizardHeader**
  - Delete step 3 &4
  - Make right steps active
  - Connect data view to **VacationRequestTransaction**
  - Empty data view contents
  - Create navigation buttons (don’t worry about making them functional yet)



Aggregate List activity

- Calculate aggregated values
  - Sum
  - Average
  - Count
  - Minimum
  - Maximum
- In combination with a retrieve → optimized query to the database

List operation: Unary

Operation	Description	Return Type
Head	The result is the first element of the list, or empty if the parameter contains zero elements or was initialized as empty	Object
Tail	The result is a list containing all elements of the parameter except the first, or an empty list if the parameter contains zero elements or was initialized as empty	List

List operation: Sort

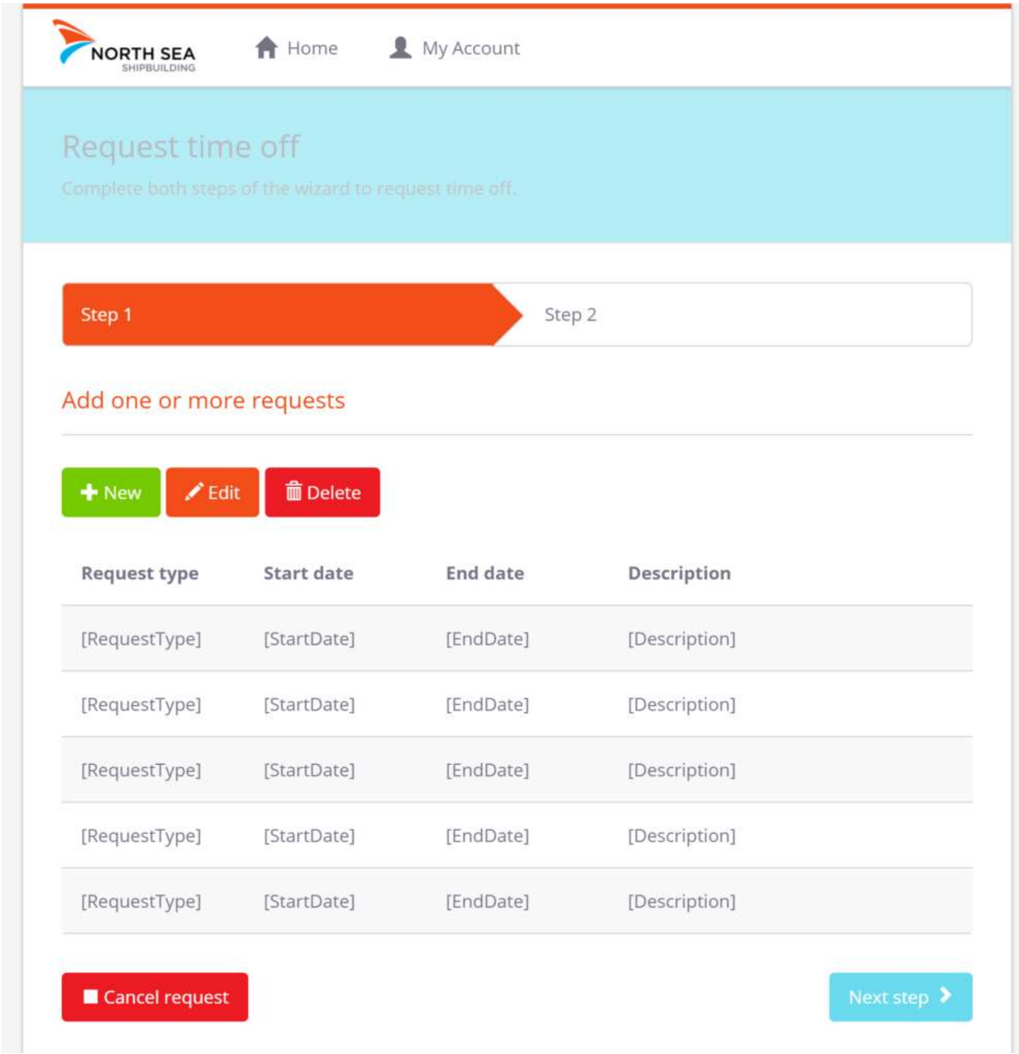
Operation	Description	Return Type
Sort	Allows you to sort a list based on a number of a attributes. The attributes are ordered to determine their priority while sorting. The input list remains in its original order while the sorted list is stored with the output name.	List

Adding requests: Wizard step 1

- Add a **data grid** to **VacationRequestTransacation data view**
  - Data: VacationRequest, over Assocation
  - Selection mode: Multi-selection
  - Show VacationRequestType as image

- Add three **Action** buttons:
  - **New;** Make sure the new **VacationRequest** object is connected to the **VacationRequestTransaction**
  - **Edit;** Make sure only 1 is selected
  - **Delete;** Make sure multiple can be deleted

- Match the design



Request time off

Complete both steps of the wizard to request time off.

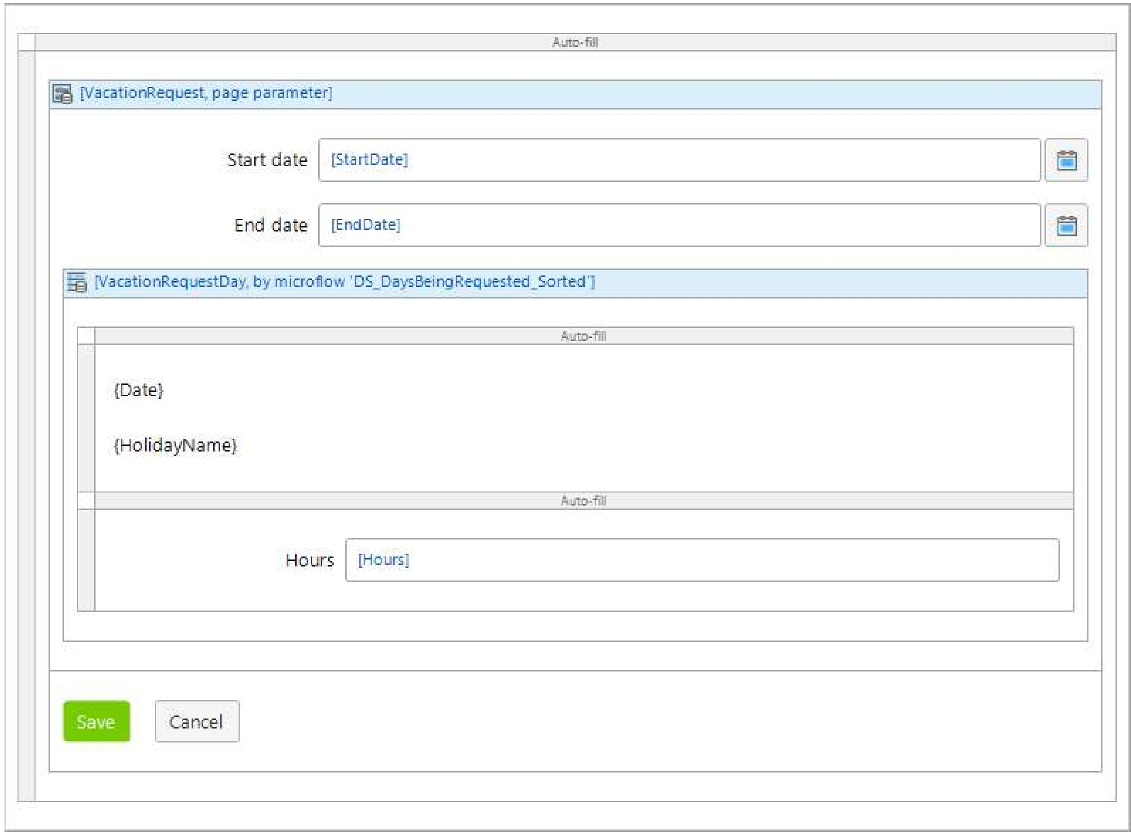
Add one or more requests

Request type	Start date	End date	Description
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]

Adding requests: NewEdit page

- Add a page called **VacationRequest_NewEdit**
  - Layout: **Atlas_TopBar**
  - Template: **Blank**

- Match the design



Calculated attributes

- Calculated when accessed
- Calculation done in a MF
- Always up to date
- Performance?
- Rule of thumb

List operation: Binary

Operation	Description	Return Type
Union	The result is a combination of the elements of both parameters avoiding duplicates	List
Intersect	The result is a list containing elements that appear in both parameters	List
Subtract	The result is the first parameter with the element(s) of the second parameter removed	List
Contains	Checks whether all elements of the second parameter are present in the first parameter.	Boolean
Equals	Checks whether the lists contain the same elements	Boolean

List operation: Member Inspections

Operation	Description	Return Type
Find	Find the first object of which the member has the given value	Object
Filter	Find all objects of which the member has the given value	List

Working with lists

Loops

- Iterate over a list of objects
- Can contain all regular microflow elements
  - Except for start & end event
  - Additional: break event & continue event
- Object is called iterator

Batches

- Processing large amounts of data
- Work with subsets of the data (one batch at a time)
- Safeguards performance

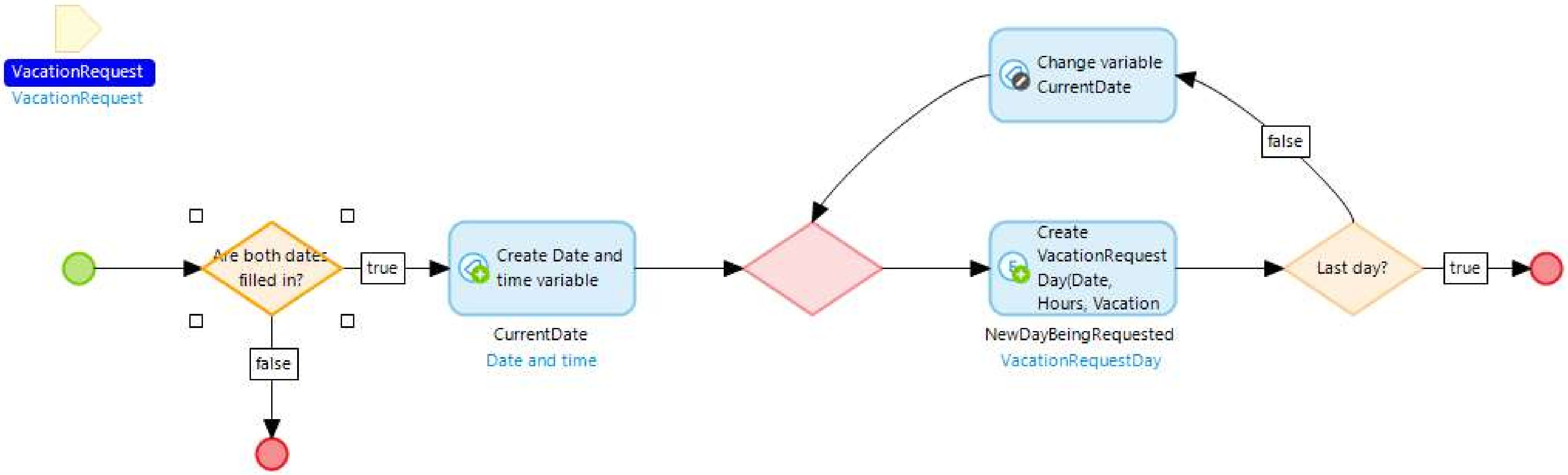
Generating vacation days: Plan of attack

1. Add microflow to on-change event start date and end date widgets
2. Generate vacation days from start date to finish date when both dates are filled in
3. Set hours requested to 0 for weekends
4. Handle changes in start date and end date by deleting all days and generating them again
5. Adjust microflow to preserve changes (don’t delete days that exist)
6. Sort the dates in a DS microflow for the list view

Generating vacation days

Generate vacation days from start date to finish date when both dates are filled in

Generating vacation days

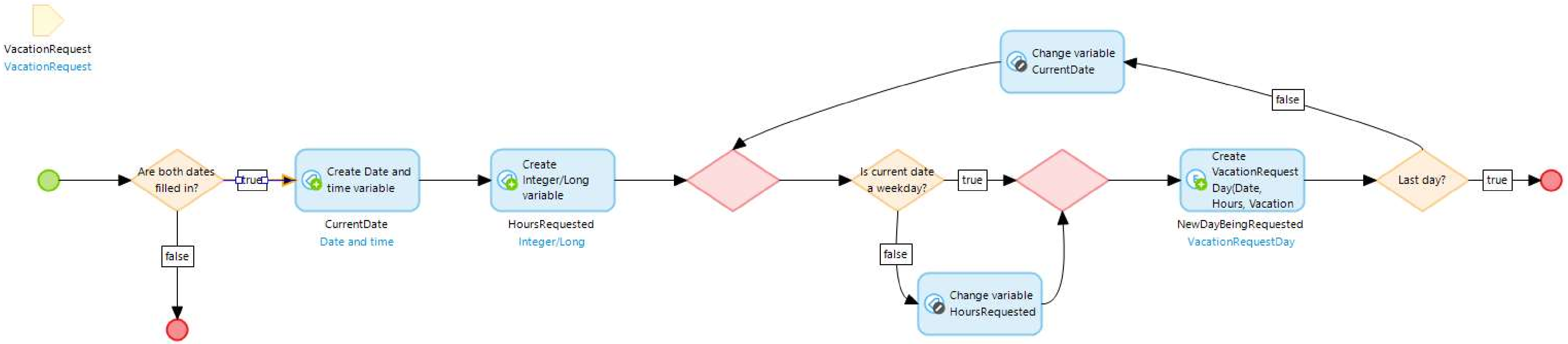

VacationRequest
VacationRequest
Are both dates filled in?
true
false
Create Date and time variable
CurrentDate
Date and time
Change variable CurrentDate
false
Create VacationRequest Day(Date, Hours, Vacation
NewDayBeingRequested
VacationRequestDay
Last day?
true

Generating vacation days

Set hours requested to 0 for weekends

Hits:
Use *parseInteger()*
and *formatDateTimeUTC()*
with the *u* modifier to get a number
for day of the week

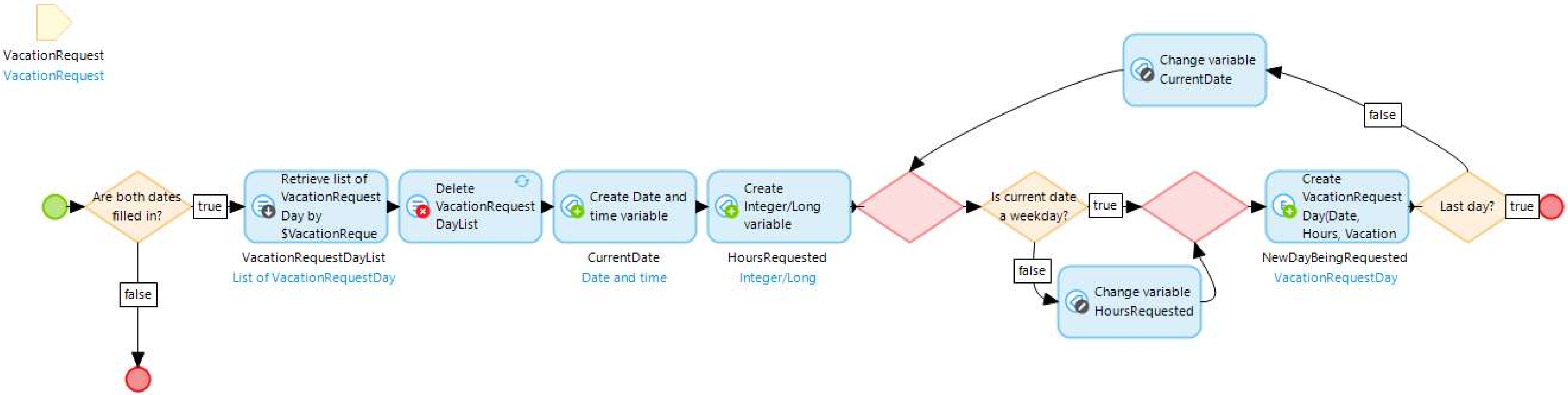
Generating vacation days


VacationRequest
VacationRequest
Are both dates filled in?
true
false
Create Date and time variable
CurrentDate
Date and time
Create Integer/Long variable
HoursRequested
Integer/Long
Change variable CurrentDate
false
Is current date a weekday?
true
false
Change variable HoursRequested
Create VacationRequestDay(Date, Hours, Vacation
NewDayBeingRequested
VacationRequestDay
Last day?
true

Generating vacation days

Handle changes in start date and end date by deleting all days and generating them again

Generating vacation days



VacationRequest
VacationRequest

Are both dates filled in?

true

false

Retrieve list of VacationRequest Day by $VacationReque

VacationRequestDayList
List of VacationRequestDay

Delete VacationRequest DayList

Create Date and time variable

CurrentDate
Date and time

Create Integer/Long variable

HoursRequested
Integer/Long

Is current date a weekday?

true

false

Change variable HoursRequested

Create VacationRequest Day(Date, Hours, Vacation

NewDayBeingRequested
VacationRequestDay

Last day?

true

false

Change variable CurrentDate

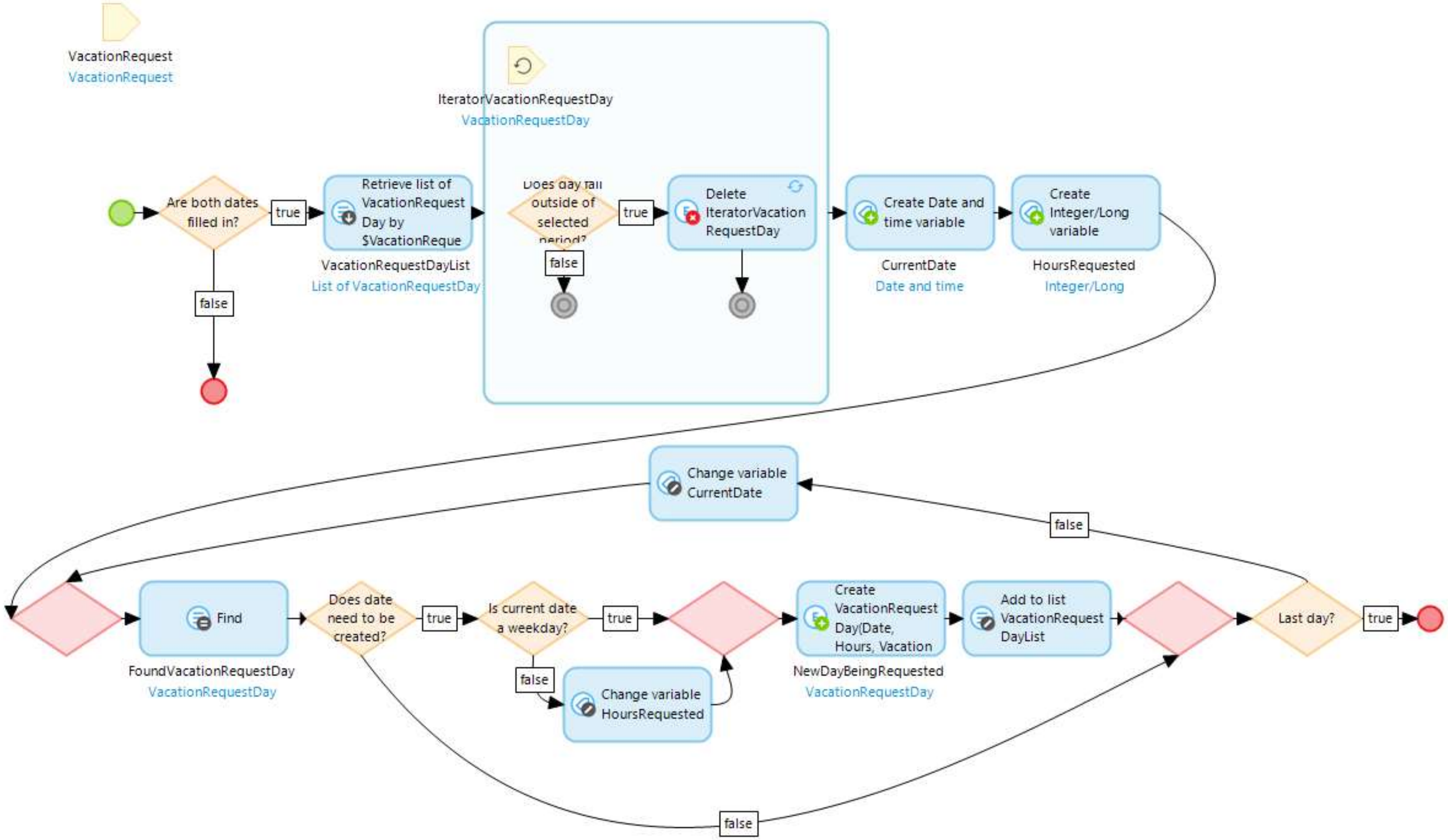
Sort vacation days

Generate vacation days from start date to finish date when both dates are filled in

Generating vacation days

DO NOT BUILD MICROFLOWS LIKE THIS

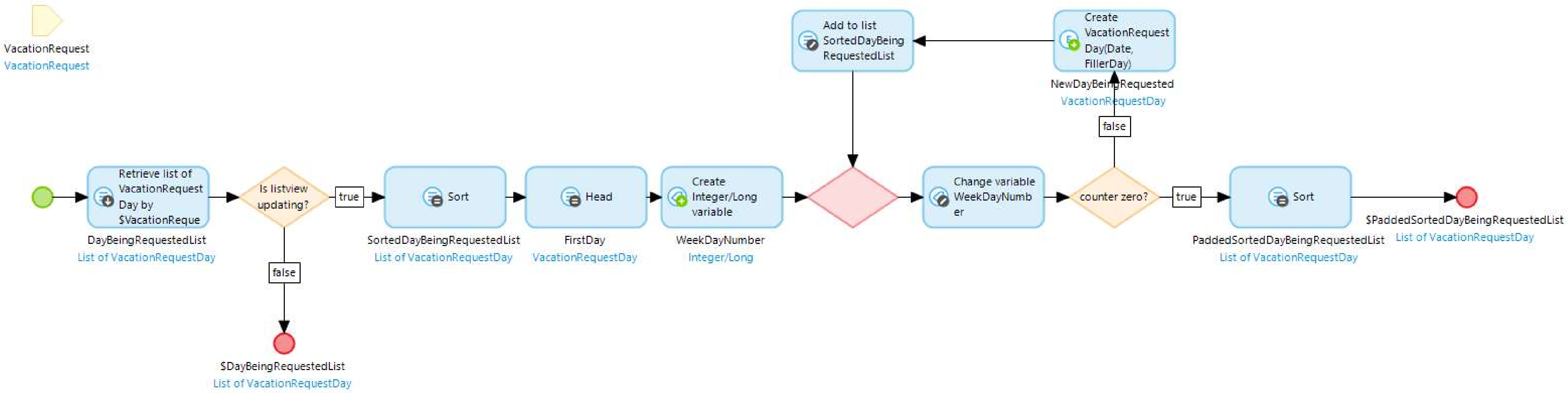
Generating vacation days


VacationRequest
VacationRequest
Are both dates filled in?
true
false
Retrieve list of VacationRequest Day by $VacationReque
VacationRequestDayList
List of VacationRequestDay
IteratorVacationRequestDay
VacationRequestDay
Does day fall outside of selected period?
true
false
Delete IteratorVacation RequestDay
Create Date and time variable
CurrentDate
Date and time
Create Integer/Long variable
HoursRequested
Integer/Long
Change variable CurrentDate
false
Find
FoundVacationRequestDay
VacationRequestDay
Does date need to be created?
true
Is current date a weekday?
true
false
Change variable HoursRequested
Create VacationRequest Day(Date, Hours, Vacation
NewDayBeingRequested
VacationRequestDay
Add to list VacationRequest DayList
Last day?
true
false

Generating vacation days

Sort the dates in a DS microflow for the list view

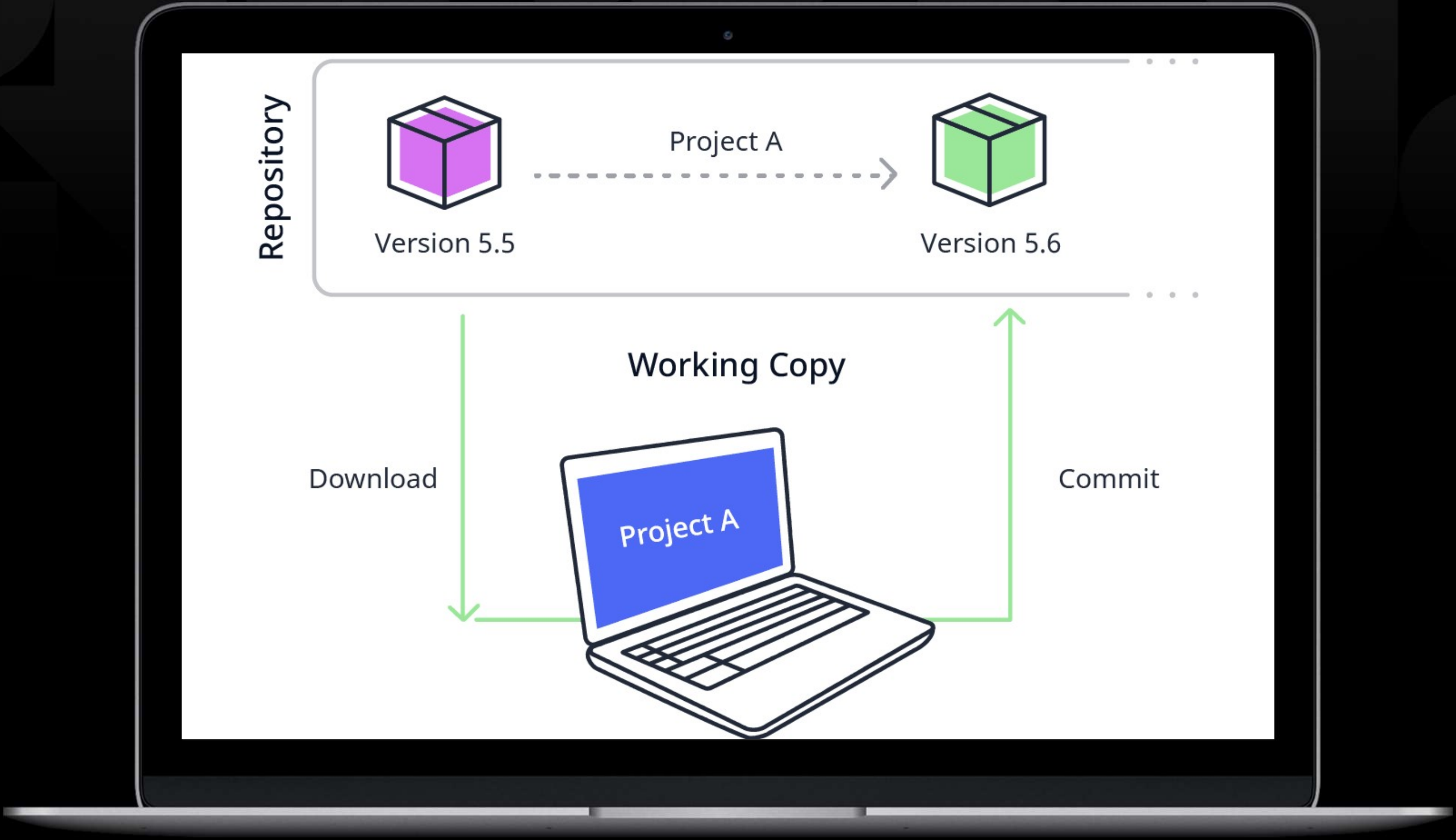
Sort vacation days


VacationRequest
VacationRequest
Retrieve list of VacationRequest Day by $VacationReque
DayBeingRequestedList
List of VacationRequestDay
Is listview updating?
true
false
$DayBeingRequestedList
List of VacationRequestDay
Sort
SortedDayBeingRequestedList
List of VacationRequestDay
Head
FirstDay
VacationRequestDay
Create Integer/Long variable
WeekDayNumber
Integer/Long
Add to list SortedDayBeing RequestedList
Change variable WeekDayNumb er
counter zero?
false
Create VacationRequest Day(Date, FillerDay)
NewDayBeingRequested
VacationRequestDay
true
Sort
PaddedSortedDayBeingRequestedList
List of VacationRequestDay
$PaddedSortedDayBeingRequestedList
List of VacationRequestDay

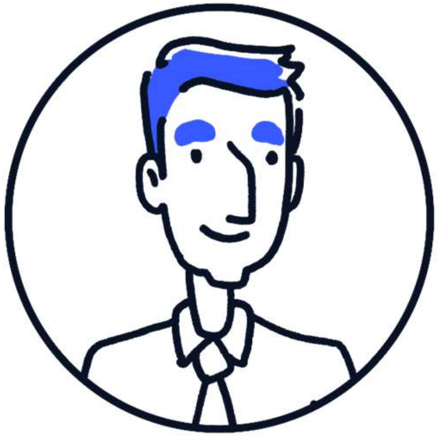
Adding requests: Wizard step 2

- Add a **calculated attribute** to the **VacationRequestTransaction** entity: **TotalHoursRequested**
- Create the microflow that will calculate the value (prefix **CAL**)
- Match the design
- Make navigation buttons functional; take validation into consideration

Commit your work



Userstory

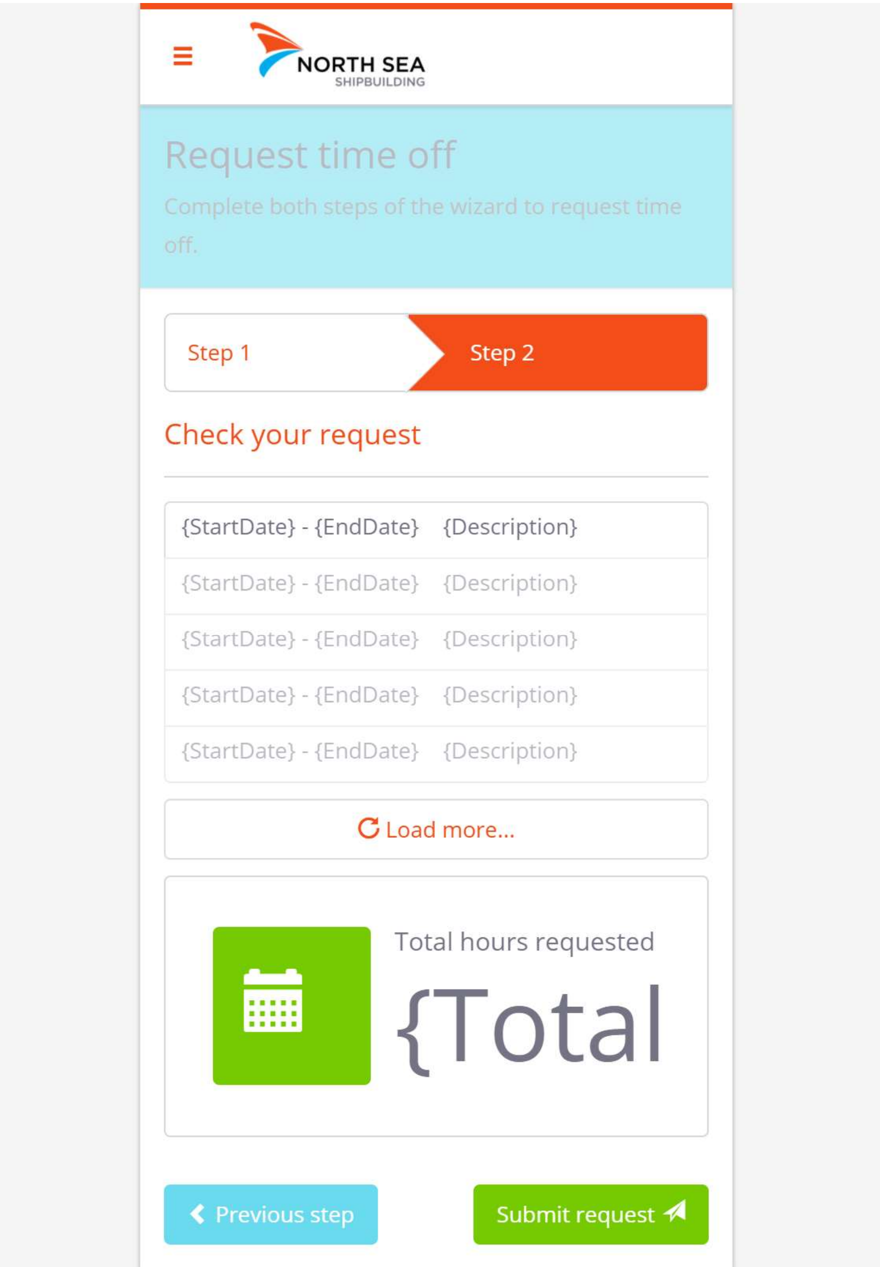


As a user I want to see the total time-off for one request so I can determine if I have enough hours left for the year

Update slide to new MF

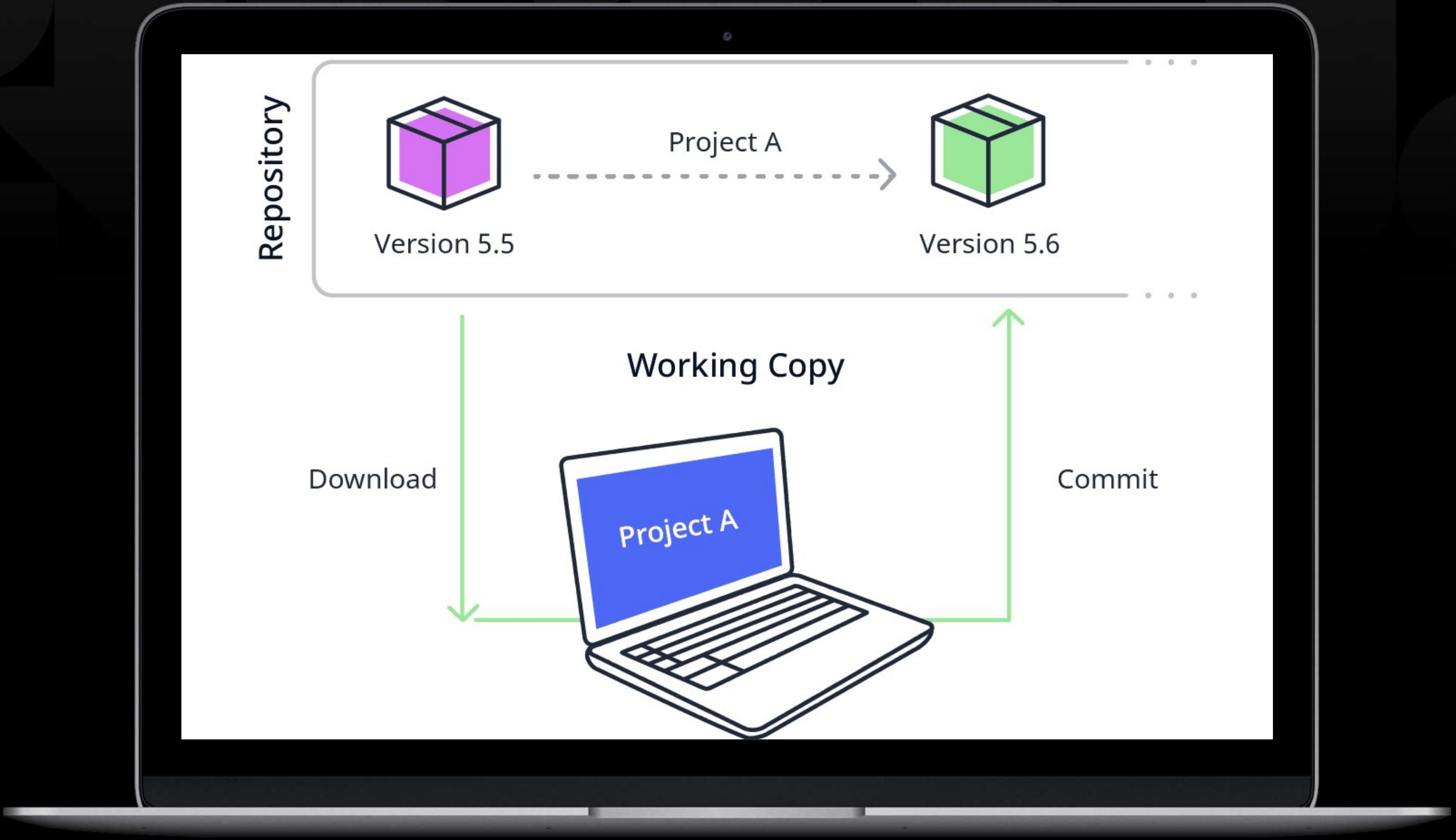
Adding requests: Wizard step 2

- Add a **calculated attribute** to the **VacationRequestTransaction** entity: **TotalHoursRequested**
- Create the microflow that will calculate the value (prefix **CAL**)
- Match the design
- Make navigation buttons functional; take validation into consideration


NORTH SEA
SHIPBUILDING
Request time off
Complete both steps of the wizard to request time off.
Step 1
Step 2
Check your request
{StartDate} - {EndDate} {Description}
{StartDate} - {EndDate} {Description}
{StartDate} - {EndDate} {Description}
{StartDate} - {EndDate} {Description}
{StartDate} - {EndDate} {Description}
Load more...
Total hours requested
{Total
Previous step
Submit request

mx mendix

Commit your work



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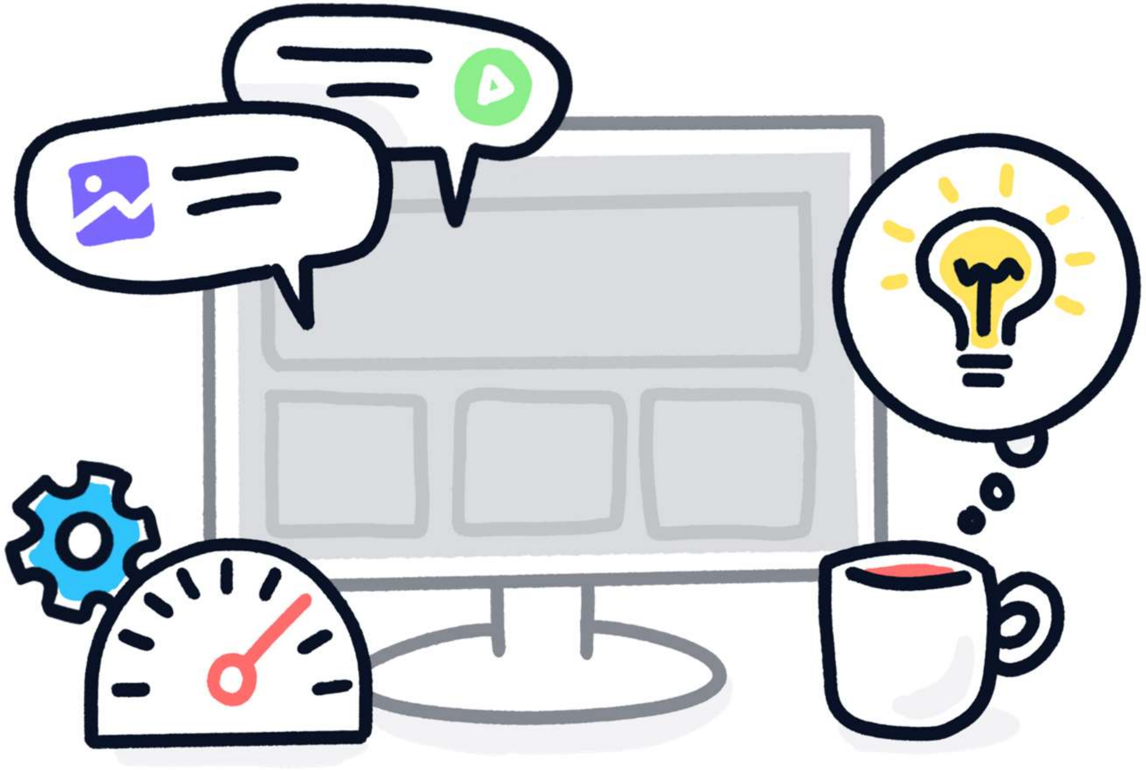
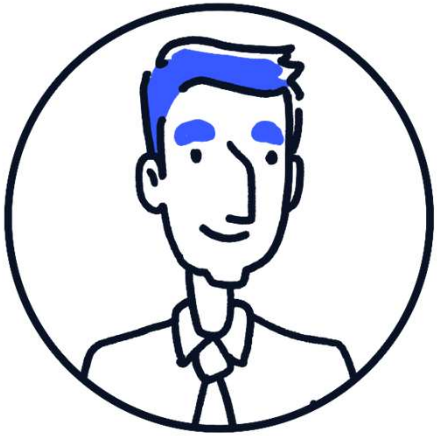
Approving requests

Learning goals

- How to create tabbed pages in Mendix
- How to create popup pages in Mendix



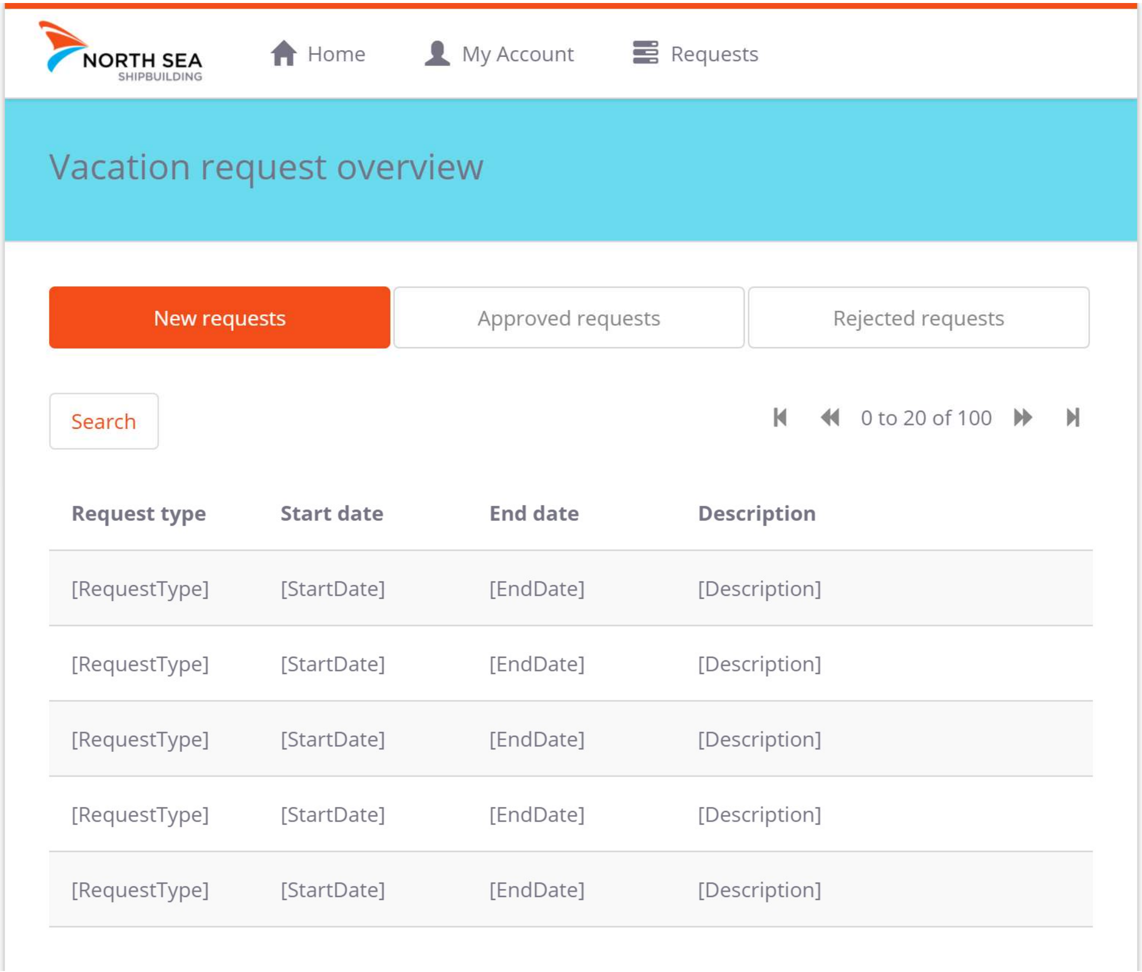
Userstory



As a manager I want to see all requests of my employees in relevant tabs so I have a good overview of my teams time-off requests

Tabbed overview page

- Create a new page, using the **Tabs full width** page template
- Match the design, showing the requests with the correct status on each tab
- Set the **New requests** tab to the Default tab
- Give the **Manager** access to the page and add it to **Navigation**



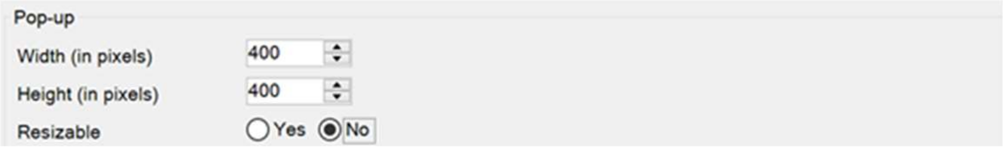
Vacation request overview

Request type	Start date	End date	Description
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]
[RequestType]	[StartDate]	[EndDate]	[Description]

Working with popups

Resizable popups

- By default: popup windows in Mendix are resizable
- It's possible to give a popup window a fixed size



Pop-up

Width (in pixels) 400

Height (in pixels) 400

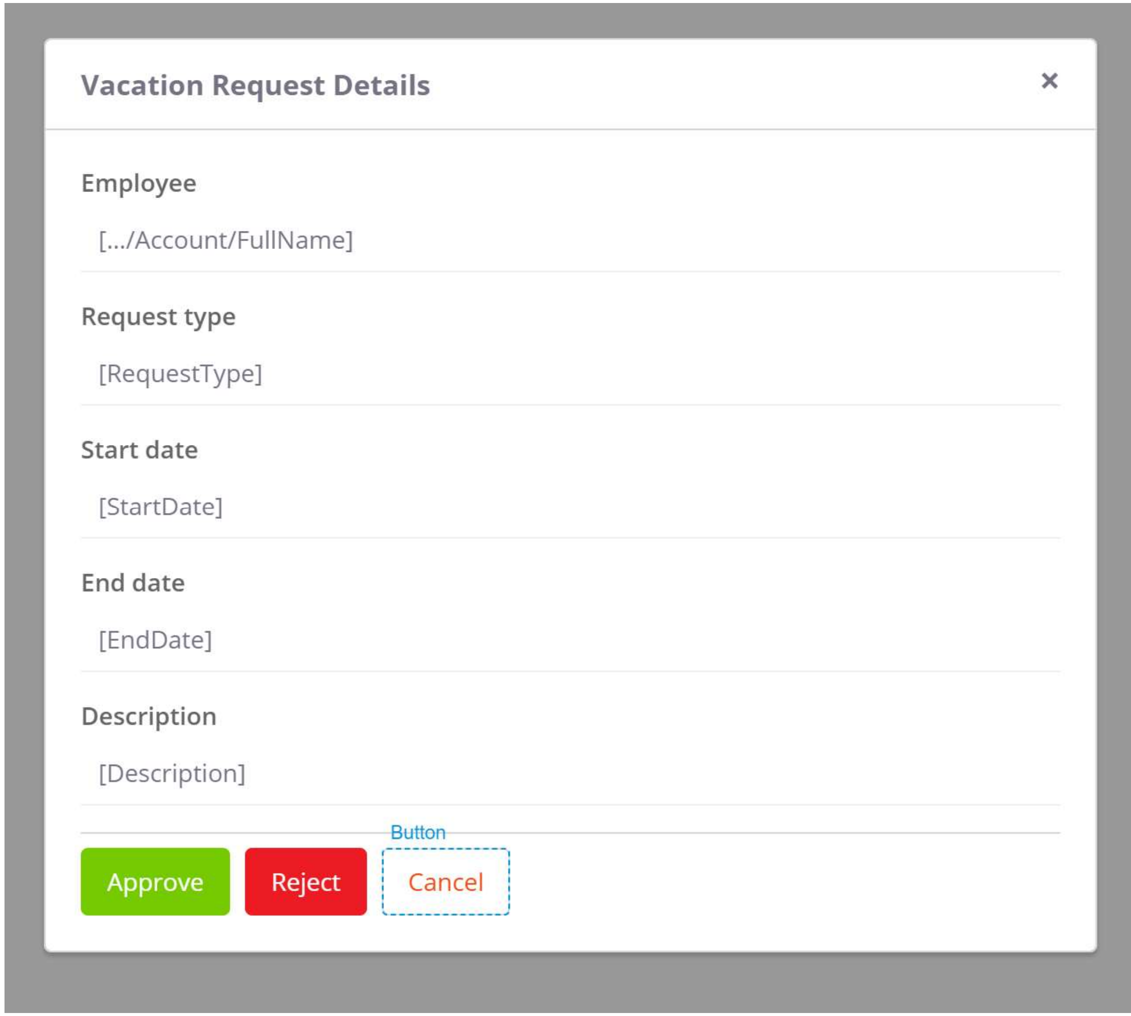
Resizable ○ Yes ● No

Popup footer

- Sticky footer vs scrollable area

Approve a request

- Add a **Details** button to the **New requests** data grid
  - Set it to default action
  - Primary button style
- Make the button open a new **popup page**: VacationRequest_Details_Manager
- Give the popup a fixed size;
  - Height 800px
  - Width 500px
- Match the design
- Add buttons and microflows that **approve** or **reject** the request



Vacation Request Details

Employee

[.../Account/FullName]

Request type

[RequestType]

Start date

[StartDate]

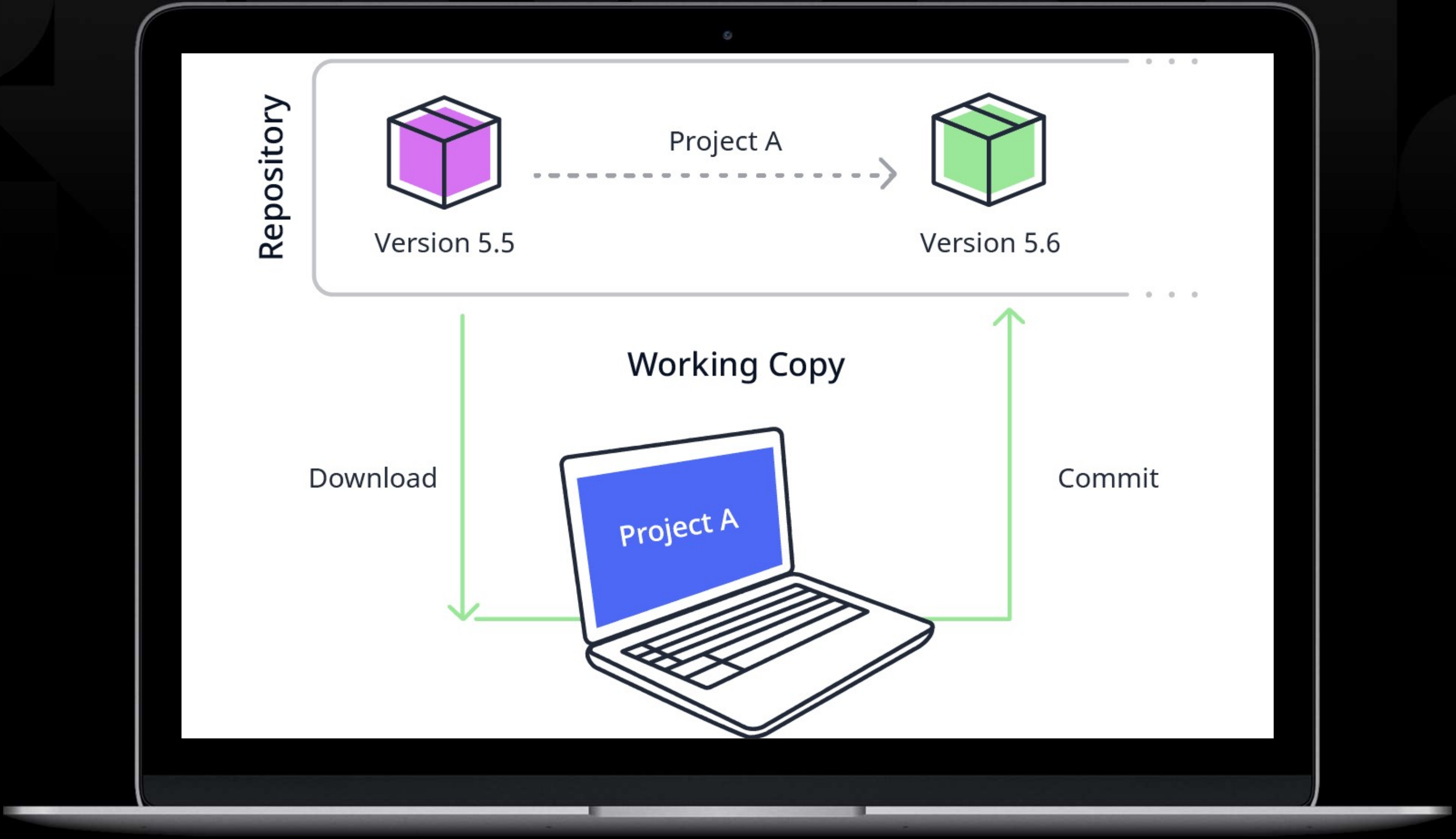
End date

[EndDate]

Description

[Description]

Commit your work

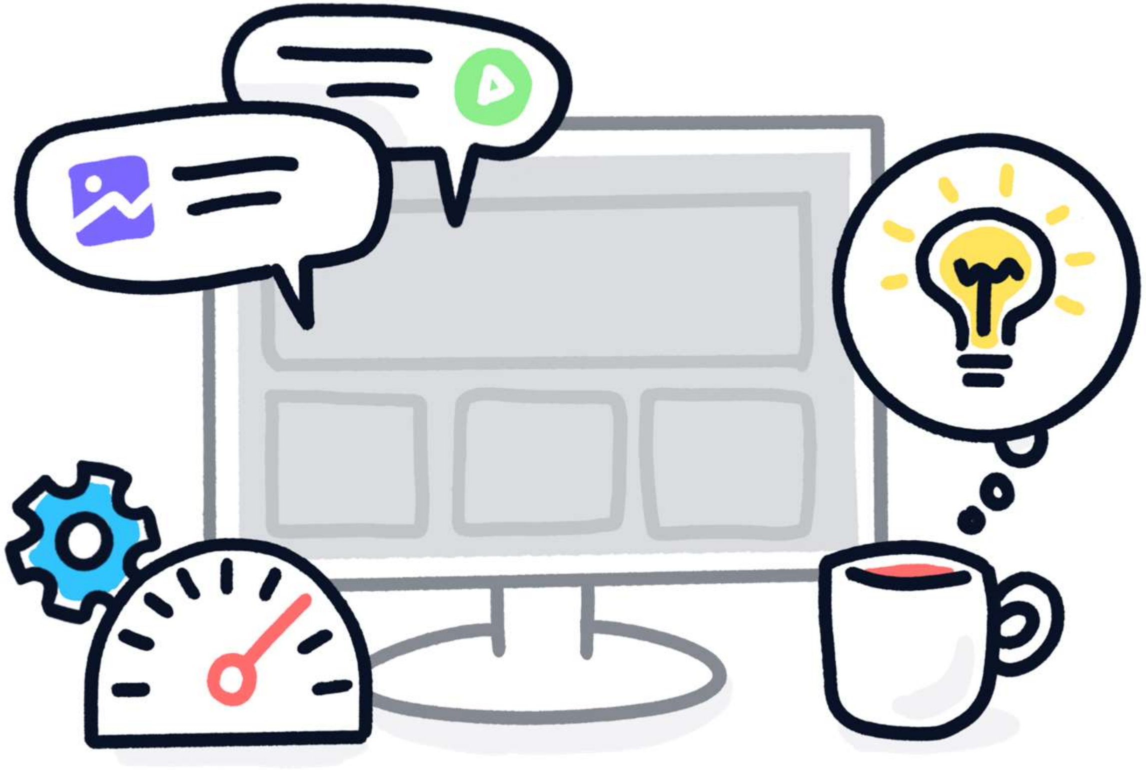


mendix

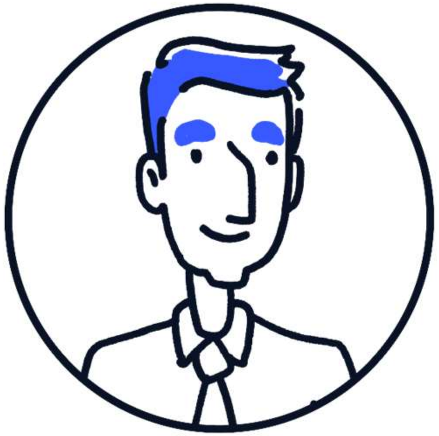
Notifications

Learning goals

In this module we will use the knowledge we gained during this course to build a notification system for our Vacation Request app



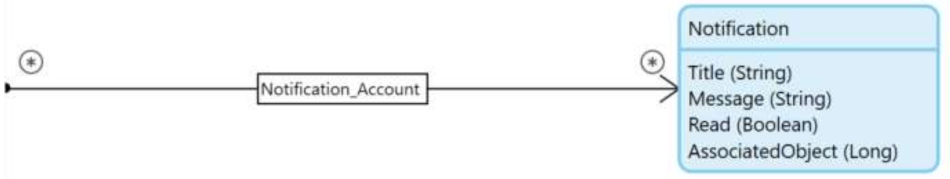
Userstory



As a user I want to be notified when the status of my request changes so I can take the appropriate action.

Building the basics

- Add a new module, called **Notifications**
- Add the **Notification** entity to the Domain Model
- Add a *-* association to the **Account** entity
- Extend the **Request** entity with a new attribute:
  - **RequestID**, type **AutoNumber**



Slide 123

SM2 Not sure of de associatie zo in de juiste richting staat.

Simone Mink, 7/30/2019

Setup security

In the **Notifications** module

- Add a new module role: **User**

- Add entity access to the **Notification** entity
  - In the **XPath constraint** tab use the **Path to User** button

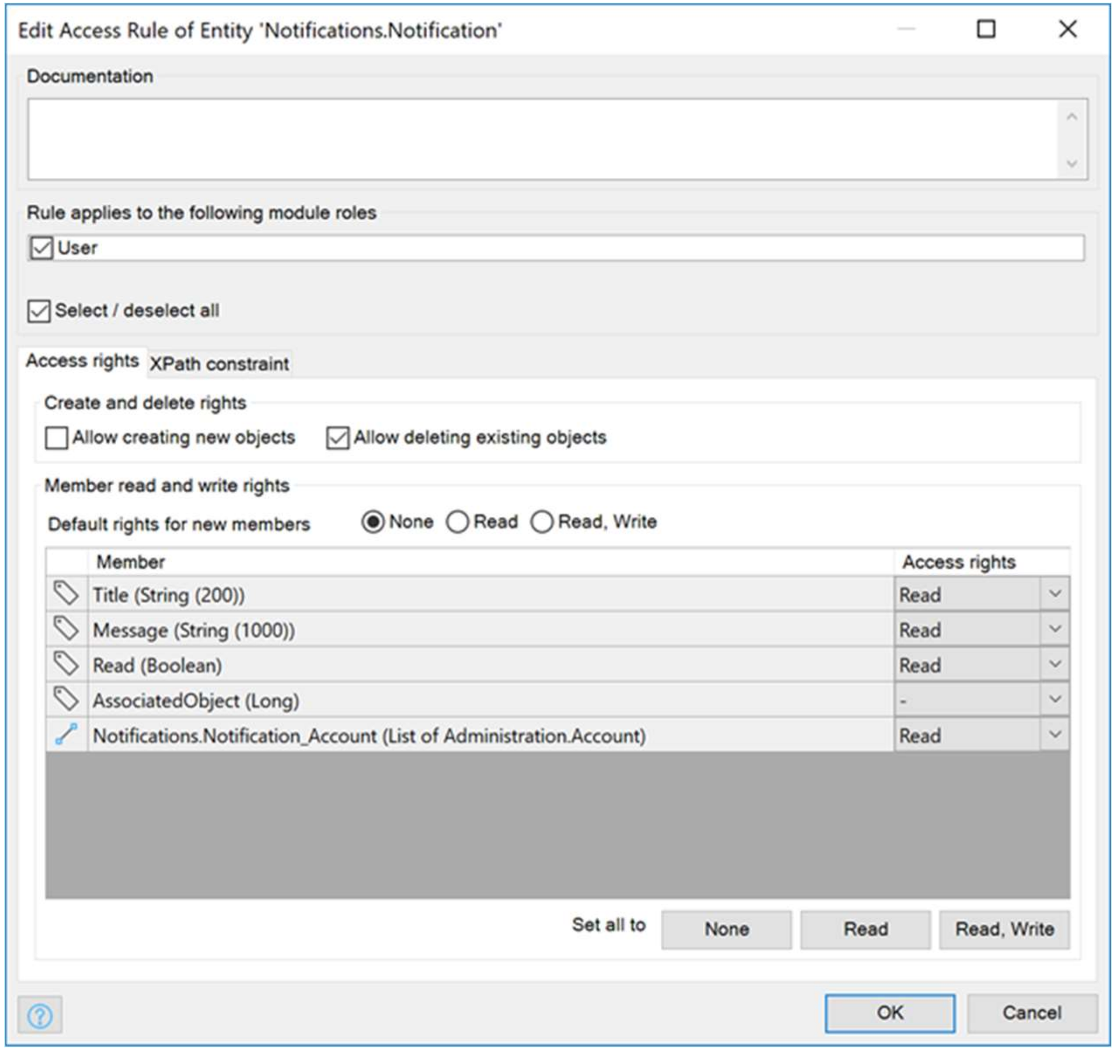
SM1

In the VacationRequests module

- Give the **Employee Read** access to the **RequestID** attribute

In Project security

- Connect the **Employee** and **Manager** user roles to the **User** module role of the **Notifications** module



Edit Access Rule of Entity 'Notifications.Notification'

Documentation

Rule applies to the following module roles

☑ User

☑ Select / deselect all

Access rights | XPath constraint

Create and delete rights

□ Allow creating new objects ☑ Allow deleting existing objects

Member read and write rights

Default rights for new members ● None ○ Read ○ Read, Write

Member	Access rights
Title (String (200))	Read
Message (String (1000))	Read
Read (Boolean)	Read
AssociatedObject (Long)	-
Notifications.Notification_Account (List of Administration.Account)	Read

Slide 124

SM1 Even checken of dit echt nodig is..

Simone Mink, 7/30/2019

Create notifications

- When a request is created by an **Emloyee**, all **Managers** should receive a notification.
- When a request is approved by a **Manager**, the **Employee** that created the request should receive a notification.
- When a request is rejected by a **Manager**, the **Employee** that created the request should receive a notification. In this case, the **Manager** should also be able to add a message, as to why the request has been rejected.

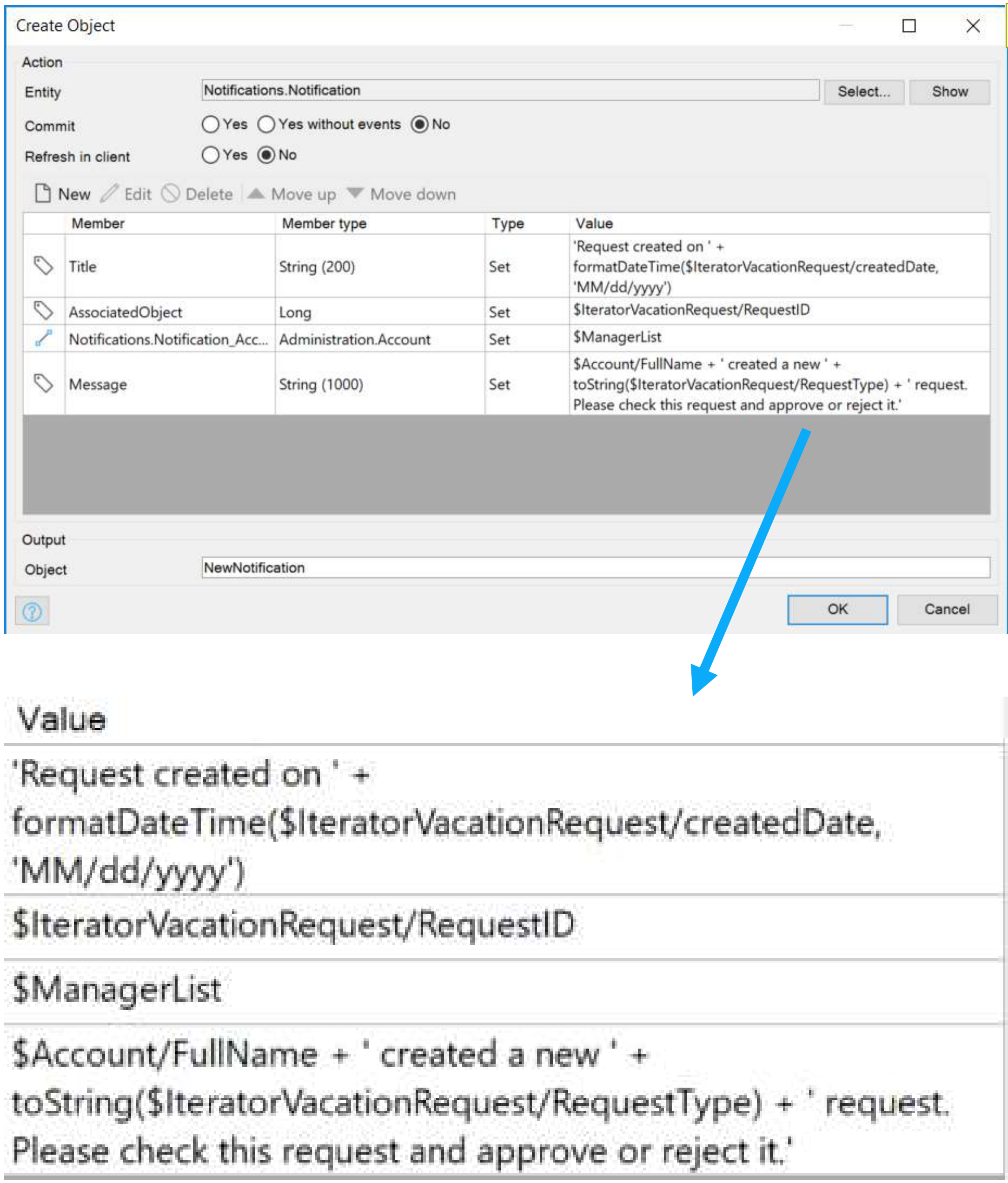
Creation notification

- Open the microflow you connected to the **Submit request** button on the last page of the wizard

- Extend the microflow:
  - Retrieve all **Managers** from the database

  [System.UserRoles = '[%UserRole_Manager%]’]

  - Create a new **Notification** object for each **VacationRequest**
  - Use the image to configure the **Create object** activity
  - Commit the **Notification(s)** and **Refresh the client**



Create Object

Action

Entity: Notifications.Notification

Commit: ○ Yes ○ Yes without events ● No

Refresh in client: ○ Yes ● No

Member	Member type	Type	Value
Title	String (200)	Set	'Request created on ' + formatDateTime($IteratorVacationRequest/createdDate, 'MM/dd/yyyy')
AssociatedObject	Long	Set	$IteratorVacationRequest/RequestID
Notifications.Notification_Acc...	Administration.Account	Set	$ManagerList
Message	String (1000)	Set	$Account/FullName + ' created a new ' + toString($IteratorVacationRequest/RequestType) + ' request. Please check this request and approve or reject it.'

Output

Object: NewNotification

Value
'Request created on ' + formatDateTime($IteratorVacationRequest/createdDate, 'MM/dd/yyyy')
$IteratorVacationRequest/RequestID
$ManagerList
$Account/FullName + ' created a new ' + toString($IteratorVacationRequest/RequestType) + ' request. Please check this request and approve or reject it.'

Slide 126

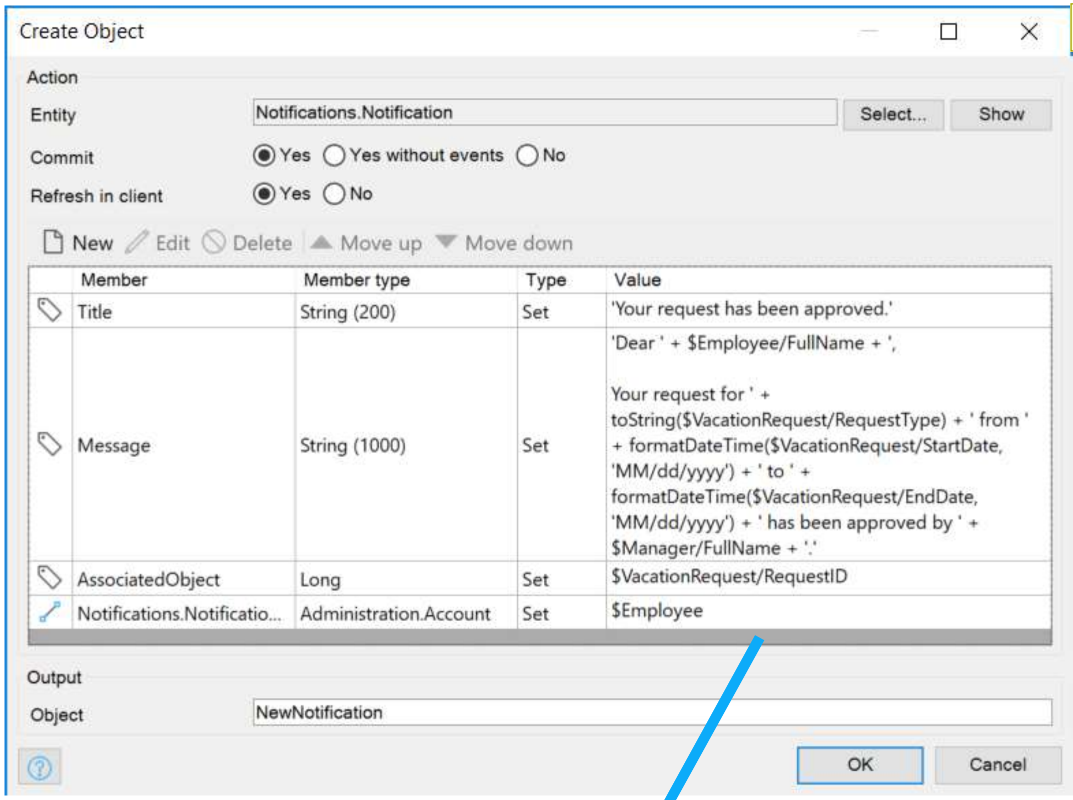
SM2 Not sure of de associatie zo in de juiste richting staat.

Simone Mink, 7/30/2019

Approval notification

- Open the microflow to approve requests
- Extend the microflow:
  - Retrieve the **Account** of the **Employee** that submitted the request.
  - Retrieve the **Account** of the **Manager** who is approving the request

  - Create a new **Notification** object
  - Use the image to configure the **Create object** activity



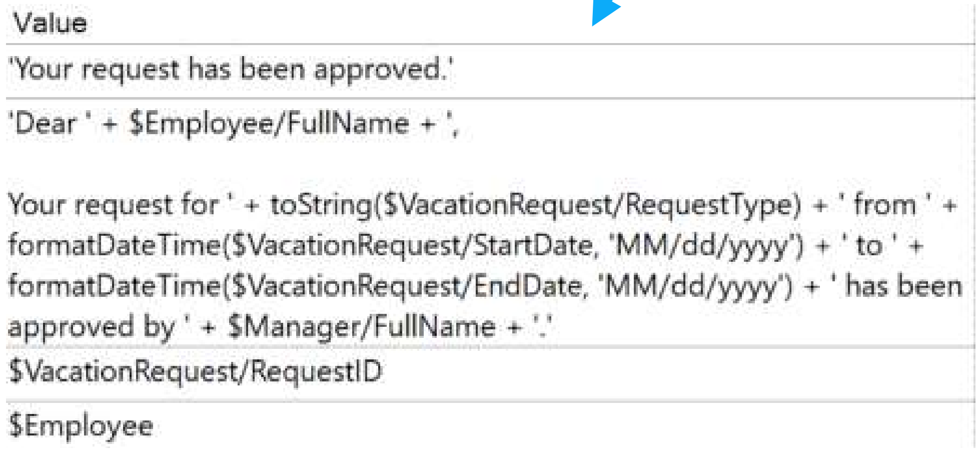
Action

Entity	Notifications.Notification
Commit	● Yes ○ Yes without events ○ No
Refresh in client	● Yes ○ No

Member	Member type	Type	Value
Title	String (200)	Set	'Your request has been approved.'
Message	String (1000)	Set	'Dear ' + $Employee/FullName + ', Your request for ' + toString($VacationRequest/RequestType) + ' from ' + formatDateTime($VacationRequest/StartDate, 'MM/dd/yyyy') + ' to ' + formatDateTime($VacationRequest/EndDate, 'MM/dd/yyyy') + ' has been approved by ' + $Manager/FullName + '.'
AssociatedObject	Long	Set	$VacationRequest/RequestID
Notifications.Notificatio...	Administration.Account	Set	$Employee

Output

Object	NewNotification



Value
'Your request has been approved.'
'Dear ' + $Employee/FullName + ', Your request for ' + toString($VacationRequest/RequestType) + ' from ' + formatDateTime($VacationRequest/StartDate, 'MM/dd/yyyy') + ' to ' + formatDateTime($VacationRequest/EndDate, 'MM/dd/yyyy') + ' has been approved by ' + $Manager/FullName + '.'
$VacationRequest/RequestID
$Employee

Slide 127

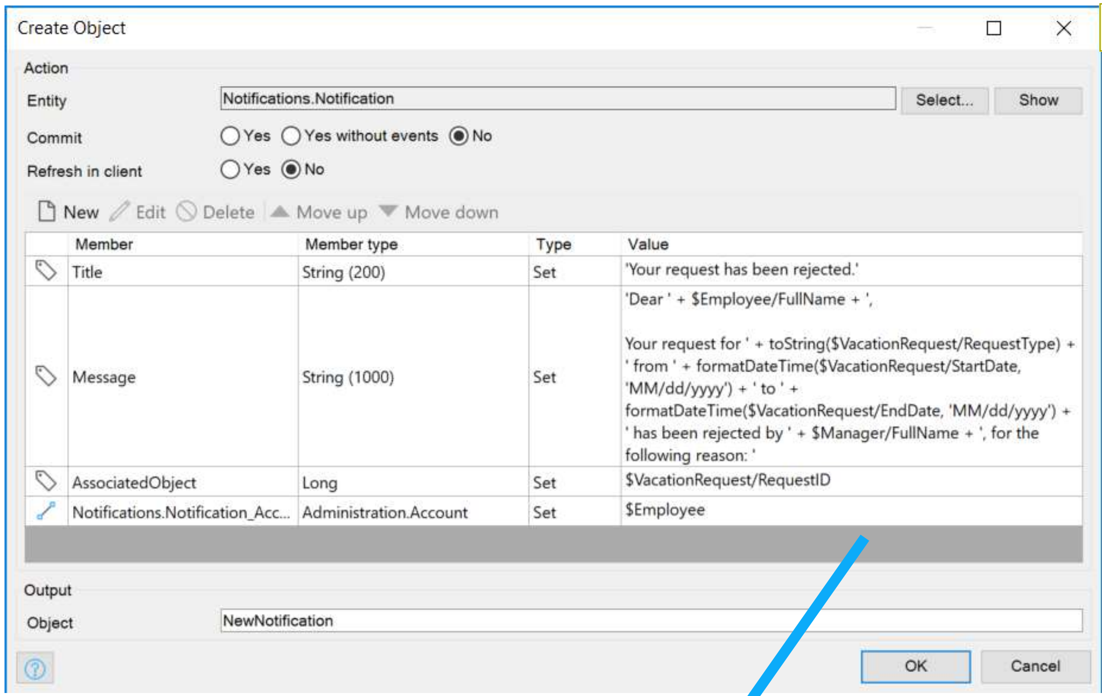
SM2 Not sure of de associatie zo in de juiste richting staat.
Simone Mink, 7/30/2019

Reject notification

- Open the microflow to reject requests
- Extend the microflow:
  - Retrieve the **Account** of the **Employee** that submitted the request.
  - Retrieve the **Account** of the **Manager** who is approving the request

  - Create a new **Notification** object
  - Use the image to configure the **Create object** activity

- At the end of the microflow add a **Show page** activity, where the **Manager** can add a the reason for rejection:



Create Object

Action

Entity: Notifications.Notification

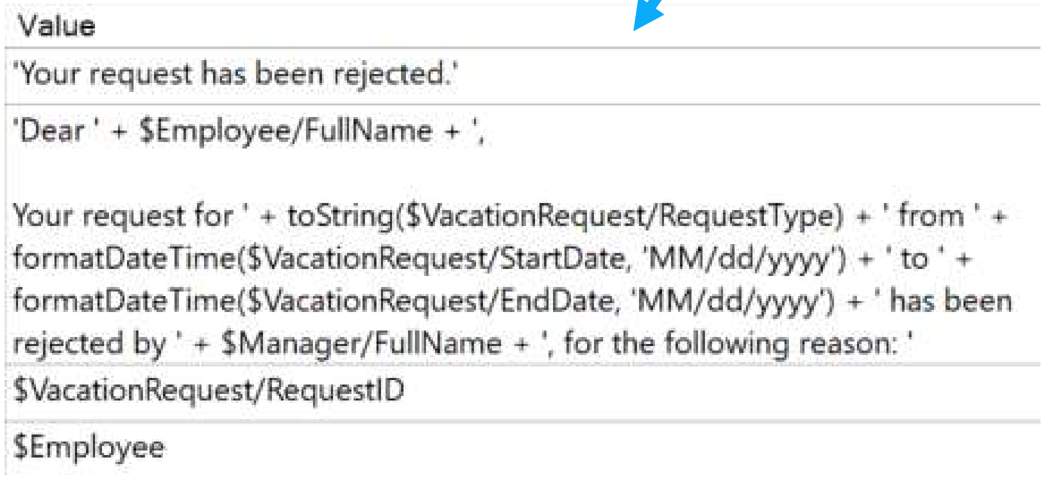
Commit ○ Yes ○ Yes without events ● No

Refresh in client ○ Yes ● No

Member	Member type	Type	Value
Title	String (200)	Set	'Your request has been rejected.'
Message	String (1000)	Set	'Dear ' + $Employee/FullName + ', Your request for ' + toString($VacationRequest/RequestType) + ' from ' + formatDateTime($VacationRequest/StartDate, 'MM/dd/yyyy') + ' to ' + formatDateTime($VacationRequest/EndDate, 'MM/dd/yyyy') + ' has been rejected by ' + $Manager/FullName + ', for the following reason: '
AssociatedObject	Long	Set	$VacationRequest/RequestID
Notifications.Notification_Acc...	Administration.Account	Set	$Employee

Output

Object: NewNotification



Value

'Your request has been rejected.'

'Dear ' + $Employee/FullName + ',

Your request for ' + toString($VacationRequest/RequestType) + ' from ' + formatDateTime($VacationRequest/StartDate, 'MM/dd/yyyy') + ' to ' + formatDateTime($VacationRequest/EndDate, 'MM/dd/yyyy') + ' has been rejected by ' + $Manager/FullName + ', for the following reason: '

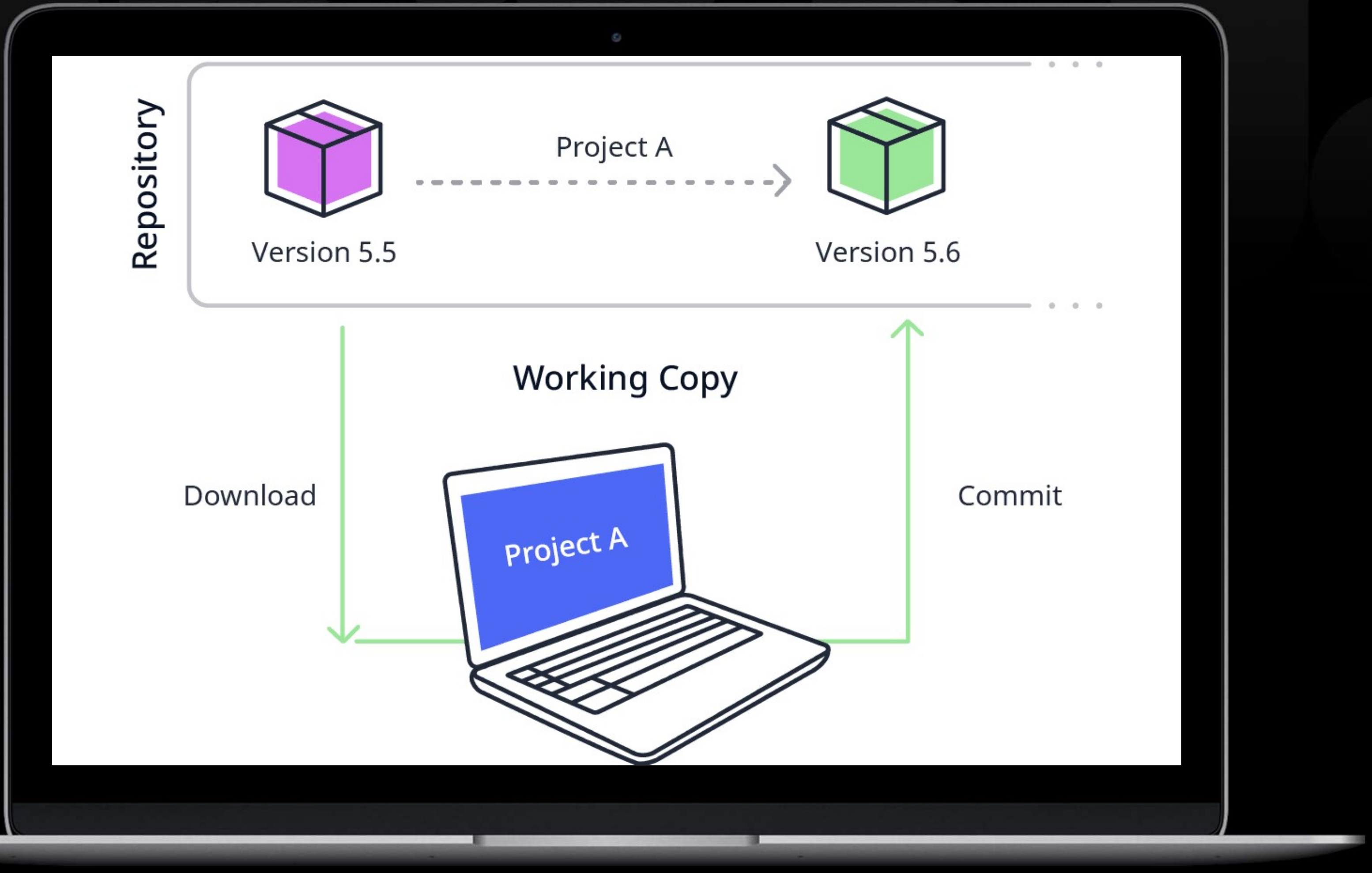
$VacationRequest/RequestID

$Employee

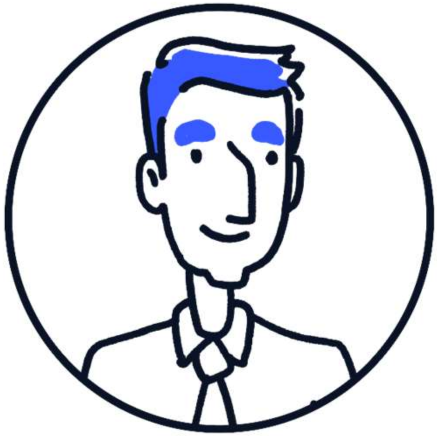
Slide 128

SM2 Not sure of de associatie zo in de juiste richting staat.
Simone Mink, 7/30/2019

Commit your work



Userstory



As a user I want an easy way to access my notifications so I don't have to search for them

Custom navigation menu

- Use **Menu** document to display a different menu then the main navigation tree.
- Can be used by a **menu widget**
- Mostly used for auxiliary menus, e.g. a side bar
- Can have multiple levels
- Can be displayed anywhere in the app

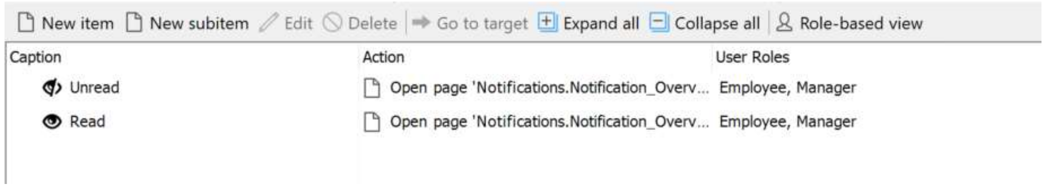
Build the notifications navigation

- Create two new pages (**Blank** template)
  - One for unread notifications
  - One for read notifications

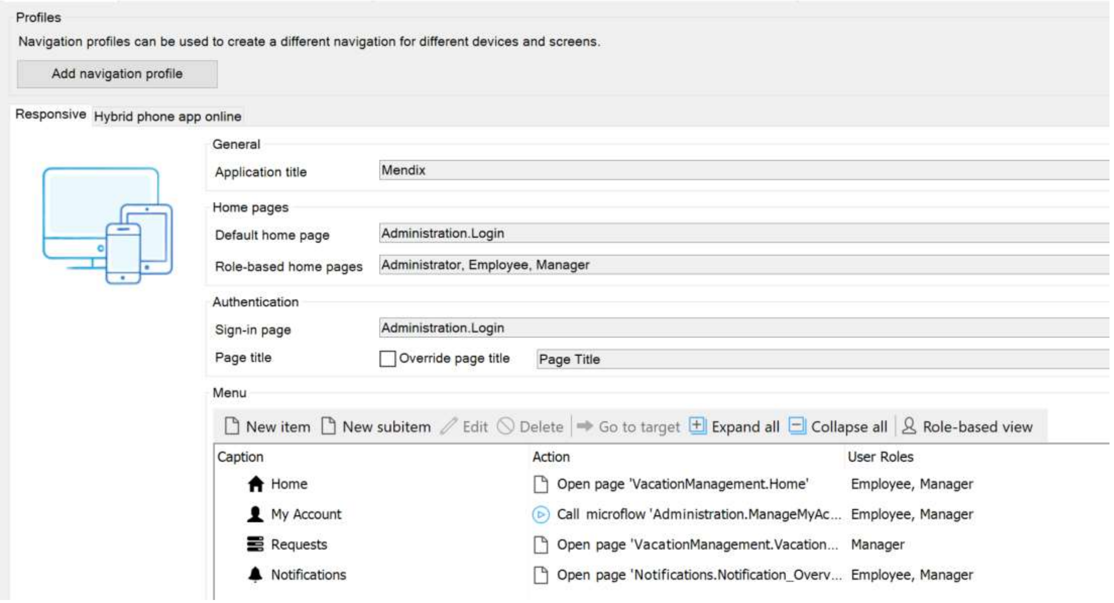
- Create a **Notifications** menu, with links to the two pages

- Add the unread notifications page to the main navigation menu as well

- Update security



Caption	Action	User Roles
Unread	Open page 'Notifications.Notification_Overv...	Employee, Manager
Read	Open page 'Notifications.Notification_Overv...	Employee, Manager



Profiles

Navigation profiles can be used to create a different navigation for different devices and screens.

General

Application title: Mendix

Home pages

Default home page: Administration.Login

Role-based home pages: Administrator, Employee, Manager

Authentication

Sign-in page: Administration.Login

Page title: □ Override page title Page Title

Menu

Caption	Action	User Roles
Home	Open page 'VacationManagement.Home'	Employee, Manager
My Account	Call microflow 'Administration.ManageMyAc...	Employee, Manager
Requests	Open page 'VacationManagement.Vacation...	Manager
Notifications	Open page 'Notifications.Notification_Overv...	Employee, Manager

Slide 132

SM2 Not sure of de associatie zo in de juiste richting staat.

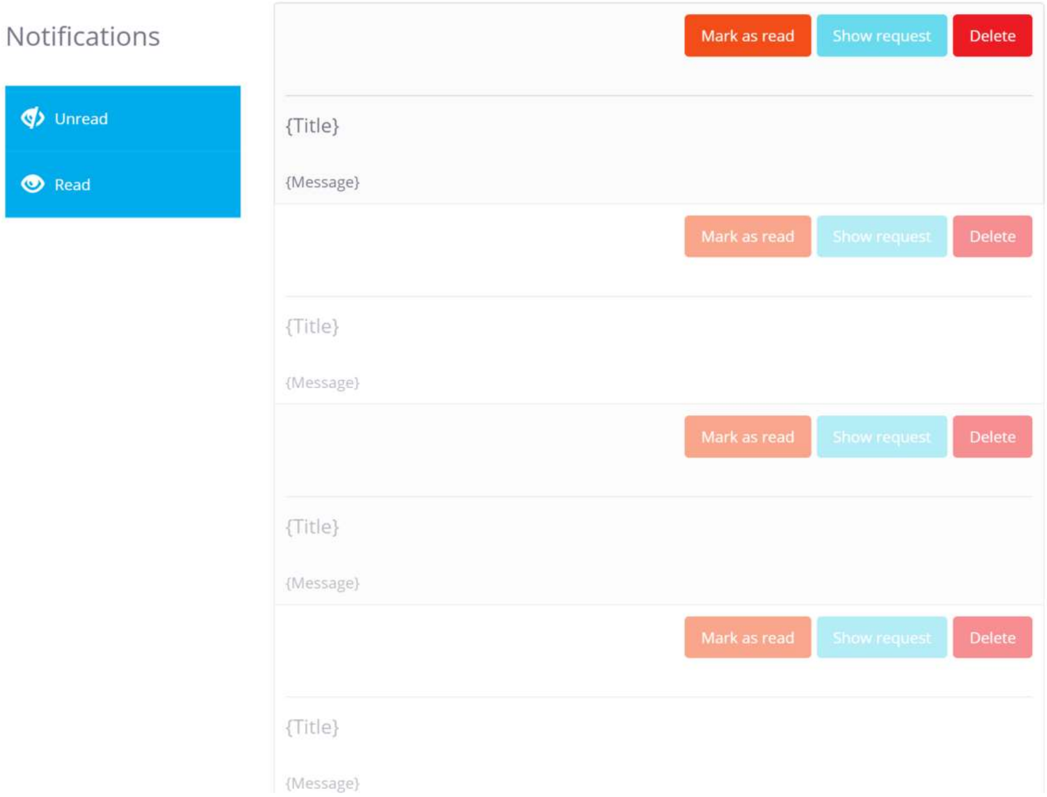
Simone Mink, 7/30/2019

Empty checks

- empty
- not()

Build the notification pages

- Using the **layout grid**, build out the two pages
  - Read should show a list view of read notifications for this user
  - Unread should show a list view of unread notifications for this user
- On the unread notifications page, use the **Pageheader controls** building block to add 3 buttons
- Where necessary, build microflows for these buttons
- Match the design

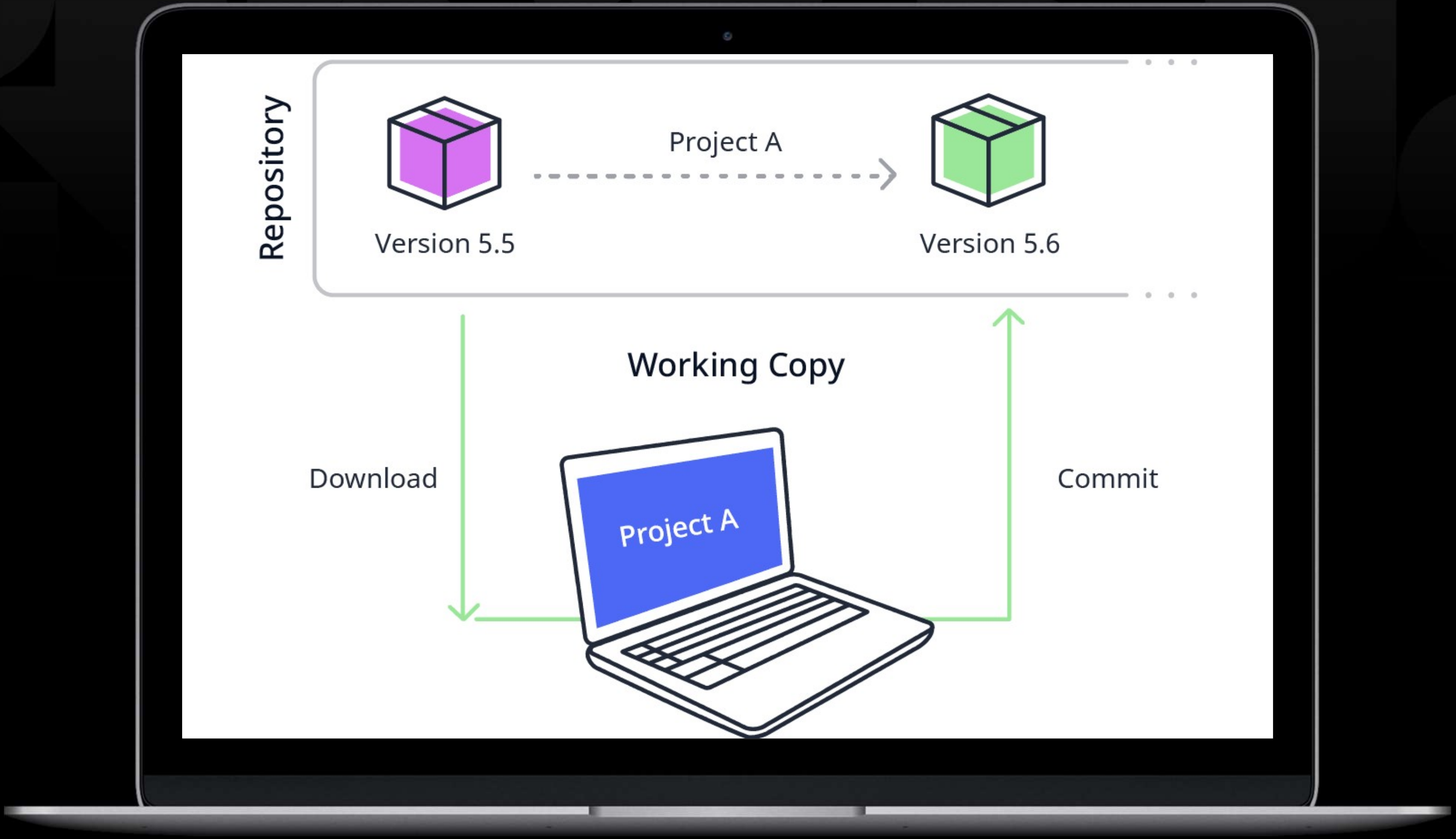


Slide 134

SM2 Not sure of de associatie zo in de juiste richting staat.

Simone Mink, 7/30/2019

Commit your work

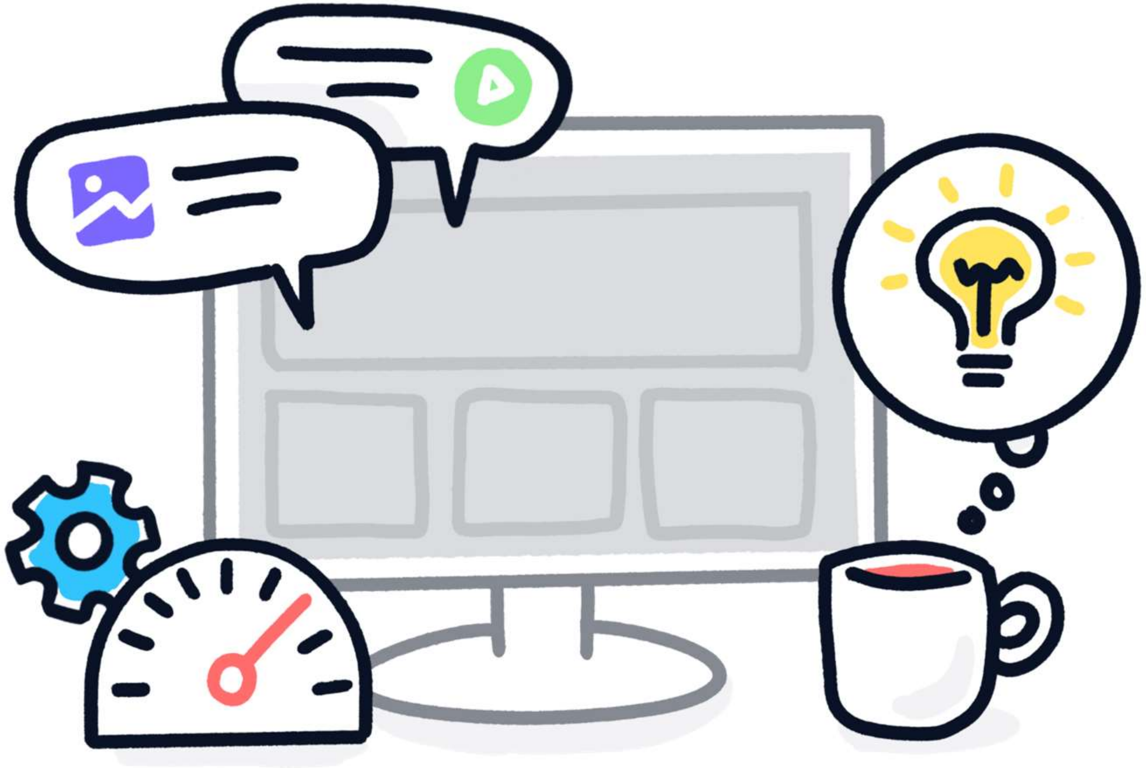


mx mendix

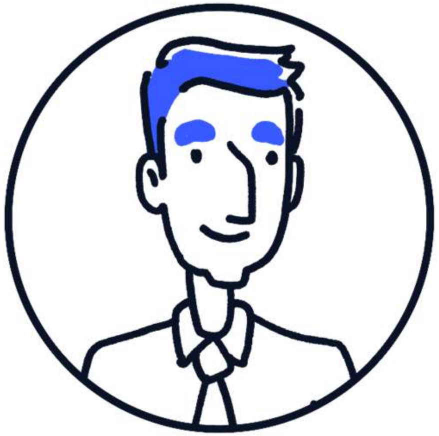
Translating the app

Learning goals

- How to translate your app



Userstory



As a user I want to use the app in my own language, so I don't misunderstand the labels in the app.

Language settings

- Project language
- Development language
- Translatable texts

  <Vacation requests>

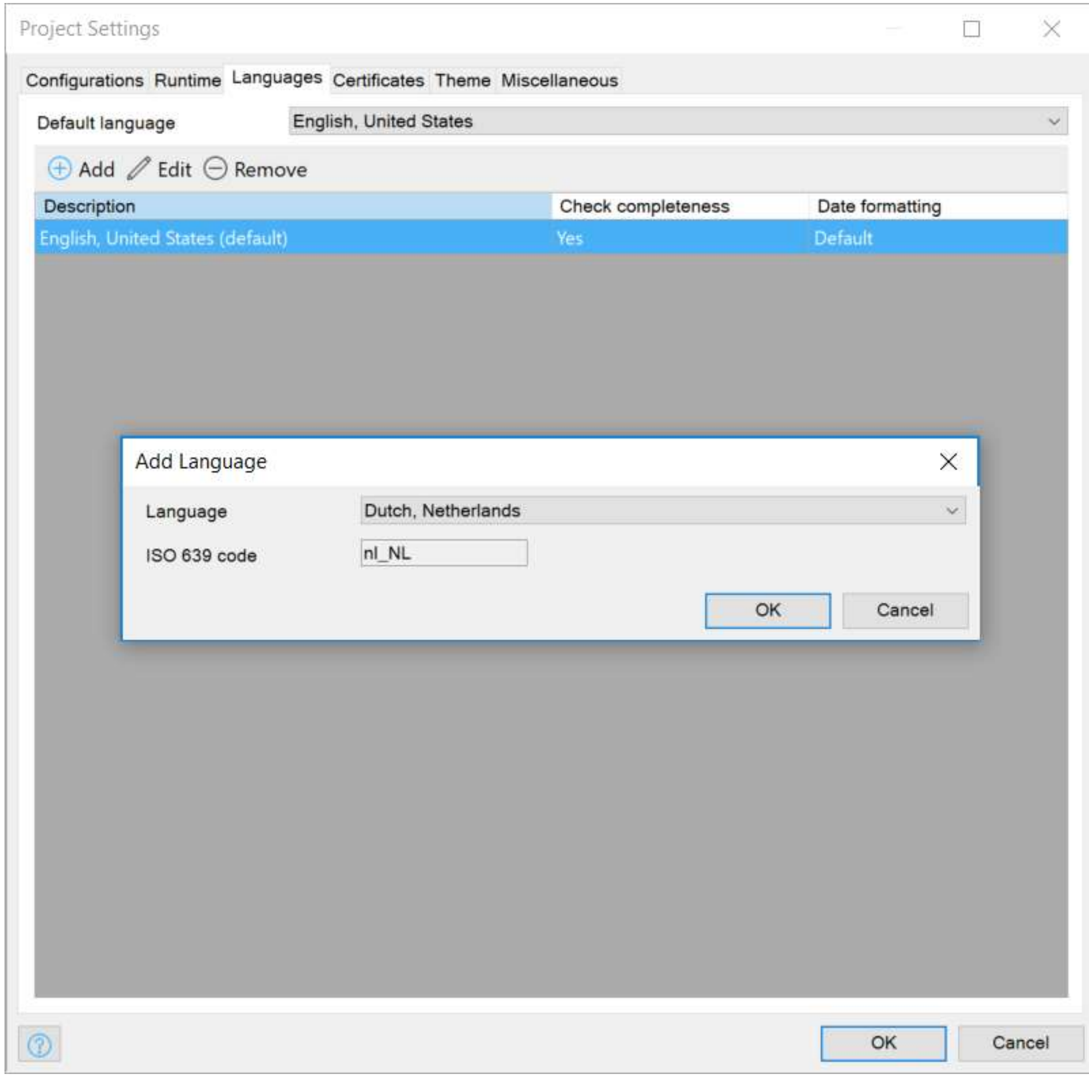
Translation tools

- Batch Translation
- Text Occurence
- Export/Import Tranlations

Add a language

- From the **Project Explorer** open the **Settings** menu
- Go to the **Languages** tab

- Add **Dutch, Netherlands** as a new language



Project Settings

Default language: English, United States

Description	Check completeness	Date formatting
English, United States (default)	Yes	Default

Add Language

Language: Dutch, Netherlands

ISO 639 code: nl_NL

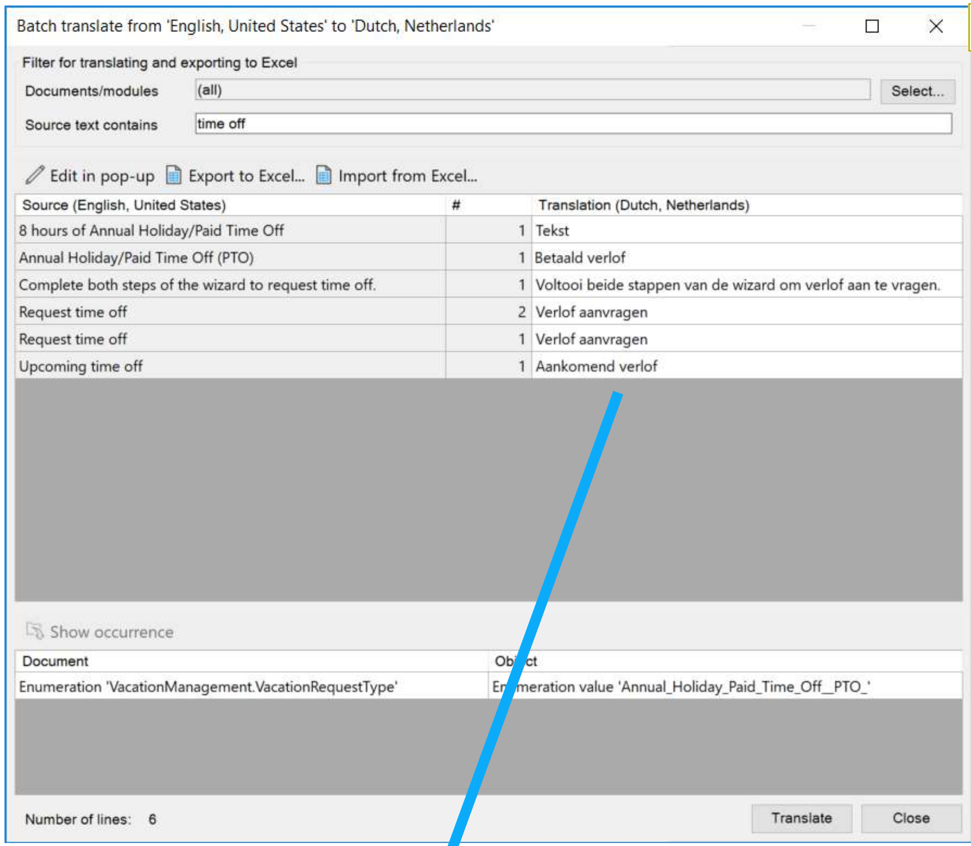
Slide 141

SM2 Not sure of de associatie zo in de juiste richting staat.

Simone Mink, 7/30/2019

Translate the app

- Set **Current language** to **Dutch**
- Open the **Home** page
  - Some text has <> around it
  - Some is translated to Dutch system text
- Use **Batch Translate** to translate from English (**Source**) to Dutch (**Destination**)



Batch translate from 'English, United States' to 'Dutch, Netherlands'

Filter for translating and exporting to Excel

Documents/modules: (all)

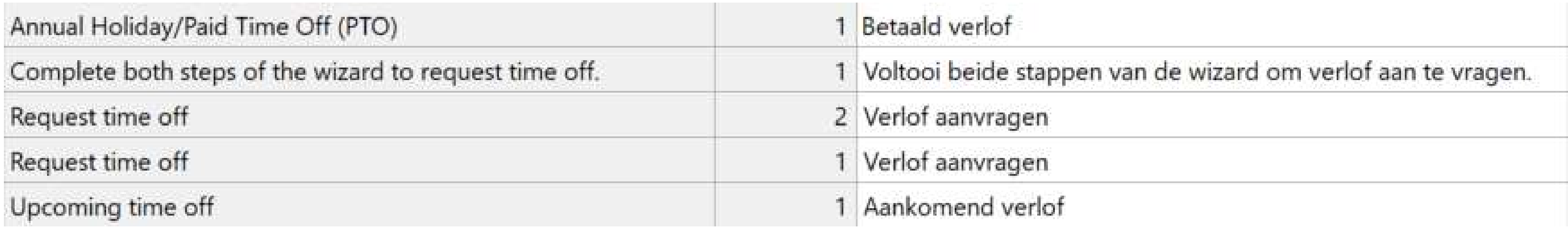
Source text contains: time off

Source (English, United States)	#	Translation (Dutch, Netherlands)
8 hours of Annual Holiday/Paid Time Off	1	Tekst
Annual Holiday/Paid Time Off (PTO)	1	Betaald verlof
Complete both steps of the wizard to request time off.	1	Voltooi beide stappen van de wizard om verlof aan te vragen.
Request time off	2	Verlof aanvragen
Request time off	1	Verlof aanvragen
Upcoming time off	1	Aankomend verlof

Document	Object
Enumeration 'VacationManagement.VacationRequestType'	Enumeration value 'Annual_Holiday_Paid_Time_Off__PTO_'

Number of lines: 6

Translate
Close



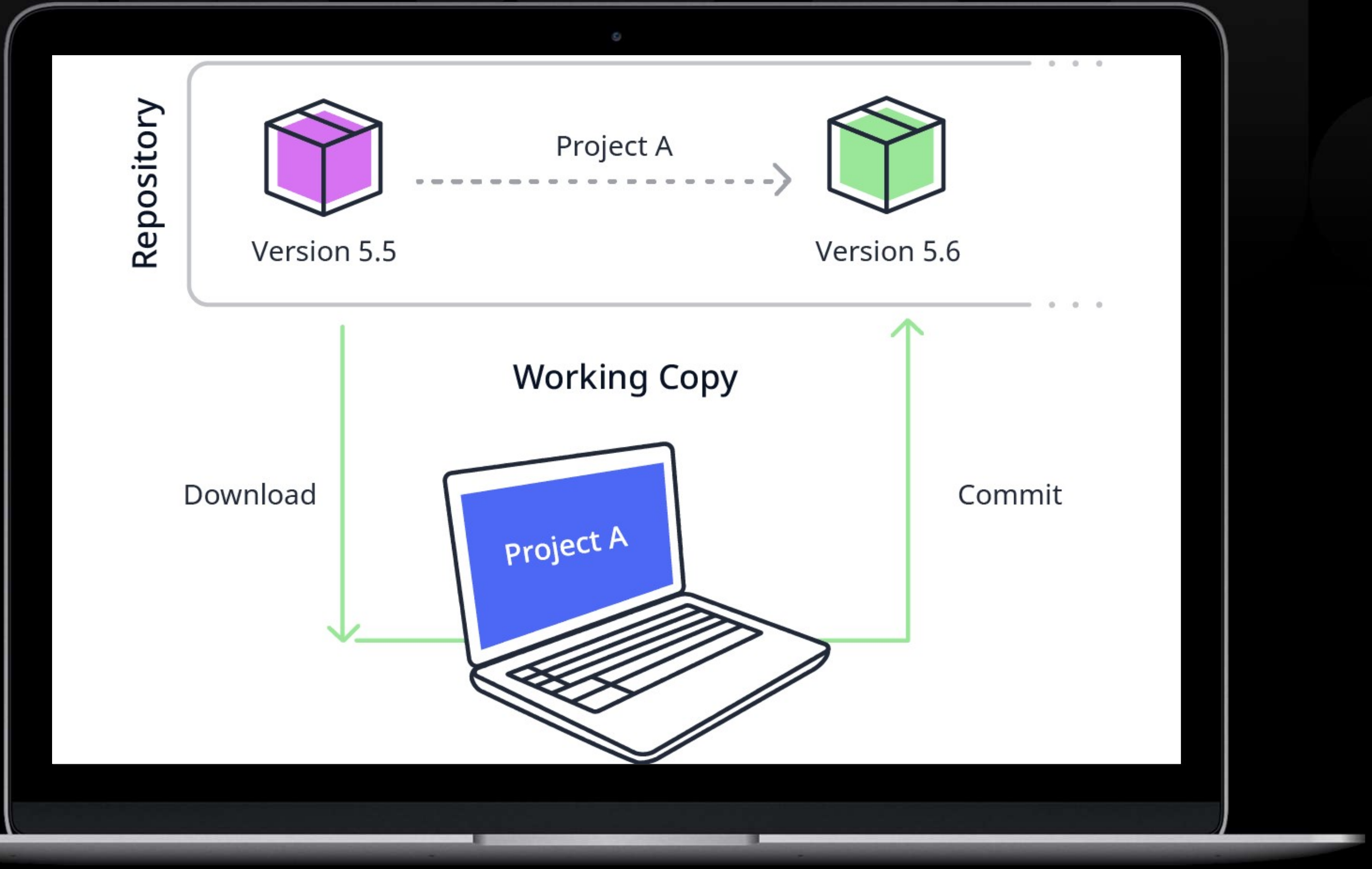
Annual Holiday/Paid Time Off (PTO)	1	Betaald verlof
Complete both steps of the wizard to request time off.	1	Voltooi beide stappen van de wizard om verlof aan te vragen.
Request time off	2	Verlof aanvragen
Request time off	1	Verlof aanvragen
Upcoming time off	1	Aankomend verlof

Slide 142

SM2 Not sure of de associatie zo in de juiste richting staat.

Simone Mink, 7/30/2019

Commit your work



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Conclusion

Feedback