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The purpose of this project is to give to *business users* a *no-code* tool for generating forms.

This project called *GFM Builder* is at prototype stage. It relies mainly on API wich are not documented, even if there are widely used in APEX export App files (before 22.1 version). This approach is clearly no supported, so this tool must be considered as a playground and used in a sandbox only.

The [application GFM Builder is available from Github](#).

Target audience

GFM Builder addresses mainly companies intranet requirements but citizen portals needs as well.

A common use case is to trigger an administrative process based on informations provided by an employee or a citizen. ie: renewal contrat, ordering internal good, signaling problem in a district, etc.

This tool will leverage, in a next version, the new approval task process which can be embeded in a page.

Once these limitations given, let's see the fonctionnal aspects.

Contenu [Afficher](#)

High level design



Persona and Role definitions

GFM Builder is dedicated to *business users*.

That means that we haven't to declare users as APEX developers. Users will be able to author and publish forms without any knowledge of Oracle APEX.

We consider the following roles:

- Regular APEX Roles
 - APEX Workspace Administrator
 - APEX Developer
 - APEX End User
- Application Roles brought with the tool
 - GFM Builder Administrator
 - GFM Builder Developer
 - Final user (means an APEX End User or an anonymous user)

The GFM Builder Role is implemented as a *Contributor* Role in the APEX simplified ACL model.

The GFM Builder Administrator role is mapped on *Admin* Role

In order to build a form, the GFM Builder Developer role must be granted to an APEX End user.

Generated Form Samples

Below are sample of forms generated with GFM Builder.



Recueil des informations pour la demande d'accès à un site sensible

Cancel Submit

Show All GENERAL RH CEFRI HABILITATIONS LOGISTIQUE TEST

* Nom du demandeur

* Activité

Site Amiante ?

Date entrée

Activité RH

Type de Contrat

Coefficient interne

Adresse

Téléphone

Email

In this case, we choosed to display fields grouped by sections (GENERAL, RH, ..)

A form can embed a detail array for multivalued informations. In this case, it's a historic of entries.



Recueil des informations pour la demande d'accès à un site sensible

Cancel Submit

Show All GENERAL RH CEFRI **HABILITATIONS** LOGISTIQUE TEST

habilitation Défense DGA ?

Historique Accès

Edit Add a row

	Nro contrat	Site	Debut	Fin
	12344	Paris	12/01/21	20/06/21
	56567	Lyon	01/01/22	30/03/22

1 rows selected

Using a detail array inside a form

Apps Store

A sample catalog application (GFM Store) is provided as an exemple. Each time a form is tagged as *Published*, it will be displayed in this catalog.



The screenshot displays a 'Form Catalog' interface with a dark blue header. The header contains the text 'Form Catalog' on the left and a user profile icon labeled 'nobody' on the right. Below the header is a grid of nine form cards, each with a colored icon, a title, and a description.

Form Title	Description
Accès Bibliothèque	Demande d'accès à la bibliothèque d'entreprise
Accès restaurant	Demande d'accès au restaurant d'entreprise pour les stagiaires
Commande papier	Commande de papier pour l'imprimante ou la photocopieuse
Entretien annuel	Fiche à remplir avec le collaborateur pour résumer l'entretien annuel
Extension de contrat	Demande de prolongation d'un contrat de maintenance
Fiche Logistique	Recueil des informations pour la demande d'accès à un site sensible
Fiche Santé	Renseignements à fournir par le collaborateur pour indiquer son état de santé
Fiche candidature	Fiche à remplir par le candidat ou collaborateur dans le cas d'une demande de mutation
Ouverture compte messagerie	Pour l'ouverture d'un compte de messagerie MS

Data collecting

All data are stored in a unique table GFM_DATA.

The data can be displayed by GFM Builder Admin and Forms owners.

Final users will not be able to display data. We suppose that a process will send data to the user, by any feedback way, email for instance. It's not in the scope of the project.



Forms	Components	Setup	Administration
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COMMANDE_PAPIER								
Seq Id ↑	Couleur	Email	Grammage	Qtepapier	Type Papier	Date Limite	Qualite	Form Id
840	bleu	patrick@mail.com	80	2	A4			194
907	bleu	pqs	120	3	ooo	9/23/2022	qSD	194
912	qsd	QSD	120	2	ooo	9/07/2022		194
CSV Excel								
1 - 3								

Simplified report displaying data collected through a form

Form design

The design process is mainly declarative. It's a matter of designing the items which constitute the form.

Instead of creating a data set then building the form (in in standard way), we create there both the data set and the form in the same user interface.

A form is comprised of items. An items is either a simple attribute (like text Field, date) or a multivalued attribute. This second kind of items is implemented as an Interactive Grid. This technical choice provides more flexibility during fields filling.

Items must be pick up from a predefined collection of components which are:

- Basic items
Text, Number, Date, email, Inline List (List of values declared inline)



- Predifined List of values

These lists are created in a dedicated page called 'Components', either by an administrator or the user himself.

- Grids

It's an existing form which is declared as being usable as a grid inside another form. ie: Historic of positions, list of contracts, etc.

Reusing existing form definitions

It's possible to copy all items of an existing form into another form.

- Inline declaration

value and label are given the same value.

- Specification declaration in component module

- External declaration

per declaring the name of the external table or view.



Sections

A section is a logical group of items which will be rendered as either a tab or a paragraph, depending a preference.

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Forms Components Setup

Options Form Properties Generate Form Preview

Fiche Logistique
Recueil des informations pour la demande d'ac...

Form Items

	Seq ↑	Label	Component
<input checked="" type="checkbox"/>	10	Nom du de...	Text Field
<input type="checkbox"/>	20	Activité	Activités
<input type="checkbox"/>	30	Site Amiante	Sites Amia
<input type="checkbox"/>	40	Site Nucléaire	Sites Nucl
<input type="checkbox"/>	50	Date entrée	Date

1 rows selected Total 35

Form Sections

Actions Edit Save Add Section

	Section Name	Rank
<input type="checkbox"/>	CEFRI	3
<input type="checkbox"/>	HABILITATIONS	4
<input type="checkbox"/>	RH	2
<input type="checkbox"/>	GENERAL	1
<input checked="" type="checkbox"/>	LOGISTIQUE	5

Close

Fields are spreaded in sub-regions if there are two sections at least referenced by items. Navigation is provided by tabs, either with regular tabs or tabs and a first overall tab.

Show All CONTACT PREFERENCES



Example of navigation with preference `$REGION_SECTION =DISPLAY_SELECTOR`

User Interface

The user interface is very classic with very minimum usage of Drag n Drop. This is a weakness if we compare with other no-code tools on the market. But on an other hand, the tool privileges flexibility in rendering, that is not the case with « Google Forms », for instance.

At the minimum, it's possible by Drag'n Drop to re-order displayed items.

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FormsComponentsSetup

Options

Form Properties

Generate Form

Preview

Commande papier
Commande de papier pour l'imprimante ou la photocopieuse / Id 194 - Page Id: 119

Form Items

Apply Changes

Q

Go

Actions

+ Add New Item

Sections

Reset

<input type="checkbox"/>	<input type="checkbox"/>	Seq	Label	Component	Display as	Section	Col Span	Description / Help Text	New line	Mand.	Condition	Co
<input checked="" type="checkbox"/>	<input type="checkbox"/>	10	historique	Historique...		PRINCIPAL			<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	20	Qualité	Text Field		BBYY			<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	30	date limite	Date		PRINCIPAL			<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	40	Type de pa...	Inline List	List	PRINCIPAL			<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	50	Nombre	Number		BBYY		qte papier	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

1 rows selected

Total 8



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Forms Components Setup

Search

	Seq	Label
<input type="checkbox"/>	20	Qualité
<input type="checkbox"/>	30	date limite
<input type="checkbox"/>	40	Type de p
<input type="checkbox"/>	50	Nombre
<input type="checkbox"/>	60	Email
<input type="checkbox"/>	70	Couleur
<input type="checkbox"/>	80	Grammage

1 rows selected

Release 0.1

item detail

Cancel Delete Apply Changes

General Infos Conditions Internal

General Infos

Label: Grammage Data Type: Grammage

Display as: Radio Group Sequence: 80 Icon:

Description: Aide sur le papier

☒ Mandatory ? ☒ New Line ? Col Span: 5

Section Id: BBYY

Rendering

Recueil des informations pour la demande d'accès à un site sensible

Cancel Submit

Show All GENERAL RH CEFRI HABILITATIONS LOGISTIQUE

Nom du demandeur

Activité: AMIANTE

AMIANTE
DEPARTEMENT TECHNIQUE
INGENIERIE ET PROJETS
SERVICES NUCLEAIRES

Date entrée

Activité RH

Type de Contrat Coefficient interne



Very Minimal Decoration

Minimal decoration

Generation options

a set of preferences drives the generation process. We have reused APEX terminology in order to be in line with the regular Developer Interface.

For the moment, there are a few preferences:

- \$ITEM_TEMPLATE (FLOATING, ABOVE, BESIDE)
- \$ITEM_HELP (Y,N)
- \$PAGE_TEMPLATE (MINIMAL_NO_NAVIGATION)
- \$REGION_SECTION (STANDARD, TABS_CONTAINER, DISPLAY_SELECTOR)



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Forms Components Setup

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Fiche Logistique
Recueil des informations pour

Form Items

10 Nom du d
20 Activité
30 Site Amia
40 Site Nucléaire Sites Nucl... List GENERAL Site Nucléaire
50 Date entrée Date GENERAL

1 rows selected

Total 34

Preferences

Edit Add Row

Preference	Value
Displays Help for Items	Yes
Main template for the form	Minimal with no navigation
Navigation mode between sections	DISPLAY_SELECTOR
Template used for Items	FLOATING

1 rows selected 1 - 4

Save

Apply Changes

Sections Reset

line Mand. Condition Co

Activité AM
Activité SE

Below are some variants depending on « Navigation between sections » preference



Recueil des informations pour la demande d'accès à un site sensible

Cancel Submit

GENERAL

Nom du demandeur

Activité
AMIANTE

Site Amlante

Date entrée

RH

Activité RH

Section in a standard rendering



Recueil des informations pour la demande d'accès à un site sensible

Cancel Submit

GENERAL RH CEFRI HABILITATIONS LOGISTIQUE

CEFRI

Habilitation amiante

☐ Encadrement ☐ Opérateur ☐ SS3 ☐ SS4

Habilitation C18 510

☐ B0 ☐ B1 ☐ B2 ☐ BC ☐ H0 ☐ H1 ☐ H2 ☐ M ☐ V

F H Nucléaires

☐ HN1 ☐ HN2 ☐ PR1 ☐ PR2

Surveillance médicale

☐ Autre opérationnel (poignet, bague,..) ☐ Neutron ☐ Opérationnel (Poitrine) ☐ Passif

EPI Standard ▼ Profil Fiche Expo ▼ Demande attribution dosimétrie ▼

Sections rendered with Tabs

List of Values

The creation of list of values is done by creating a new component with a LIST type. Then, a second page is used for entering the values.



GFM - Form Builder									
Forms Components Setup Administration									
Lib	Notes	Ctype	Groupe	Id	Obj Name	Vtype	Icon	Internal	
Text Field	Standard Text field used for short text	Text Field		4	46			N	
Email	Email	Text Field		201	46			N	
Number	Number	Number		5	46			N	
Date	Date field	Date		21	46			N	
Text Area	Text area with 1000 char max	Text Area		6	46			N	
Yes / No	Answer with two choices: Yes or No	List		1	46	RADIO		N	
Habitations Nucléaires	Habitations dans le domaine des services nucléaires	List		11	46	RADIO		N	
Habitations C18 - 510	Habitations dans le domaine de l'électricité	List		12	46	CHECKBOX		N	
FORM TYPES	Form type used by GFM Builder	List		81	46	LIST		Y	
Inline List	List of values declared at form level	List		221	46	LIST		N	
Activité RH	Domaine de responsabilité Ressources Humaines	List		41	46			N	

List of components (The predefined lists are tagged List)

Component details

Edit

Habitations C18 - 510

Habitations dans le domaine de l'électricité

Values

Add new Value +

Id	Displayed as	Internal Value	Is Default ?
50	B0	B0	
52	B1	B1	
54	B2	B2	
66	BC	BC	
40	UN	UN	

Entering the values for a List of Values component.

Conditionnal displaying

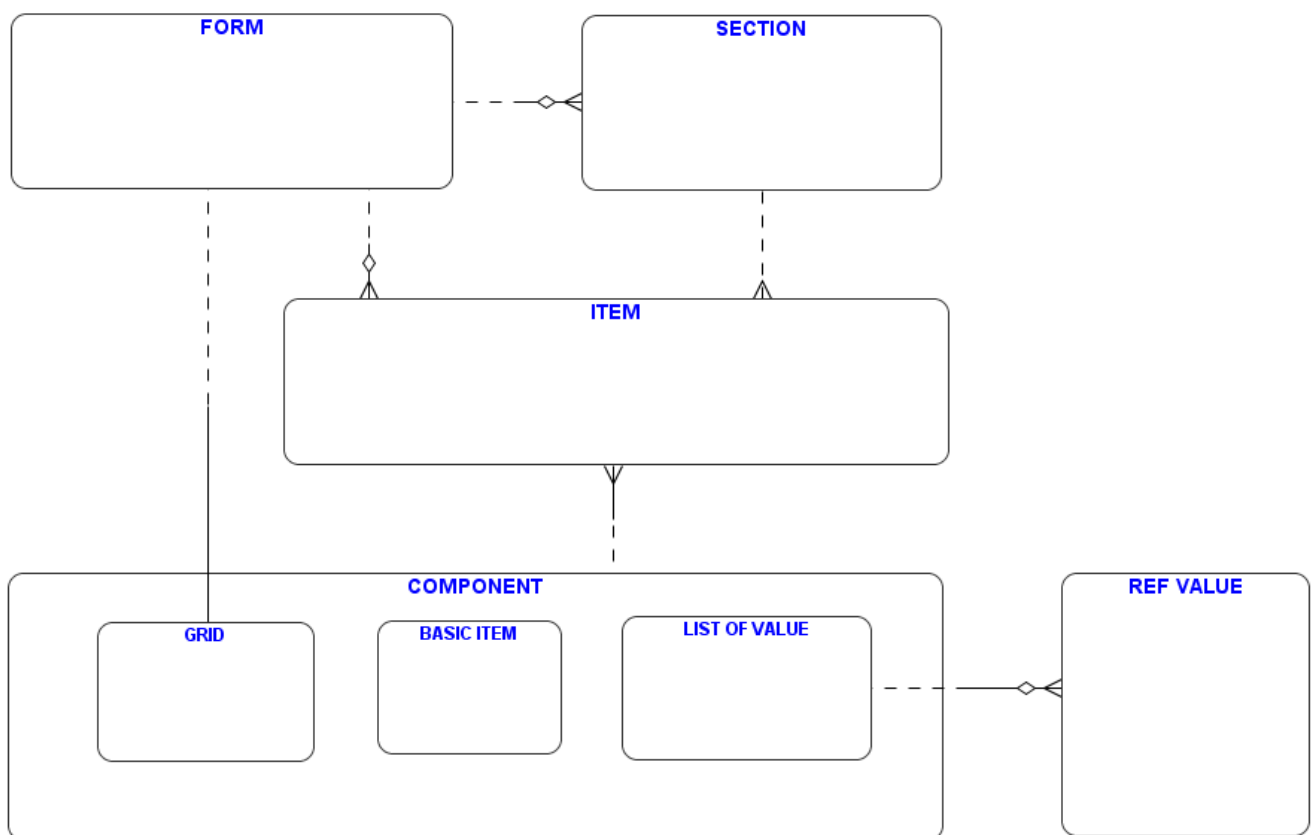
An item can be displayed or not depending the value of an other item. If the driving item is based upon a List, the list of values will be proposed for choosing a specific



value which will trigger displaying of slave item.

Technical design

Data Model



Implementation

- A data model for the form/Sections/Items, preferences and components
- A main data store (GFM_DATA), designed in the same way that the apex_collection table. There are 50 items at maximum.
- As many views there are forms. Each view is given an *instead* trigger.
- For each form, a specific view maps columns on given columns of the gfm_data



table.

Generating process

- Re-generate specific view
- Re-generate specific Trigger
- Generate the corresponding Page in a target Application.

The target application must belong to an arbitrary Application Group called 'GFM Apps' and must be choosed in the setup page. The 'GFM Apps' is automatically created during installation of GFM Store application.

List of Values

All the data are stored in a dedicated table: GFM_LOV.

Objects are named in Oracle database with GFM_ prefix

Lifecycle

If an item is renamed, there are no impact in the mapping

If an item is dropped, the mapped column in the GFM_DATA table is preserved, and no other item won't be mapped on it. The reason it that we want avoid to display old data with the new item.

An option menu allow to reset data and column mapping.

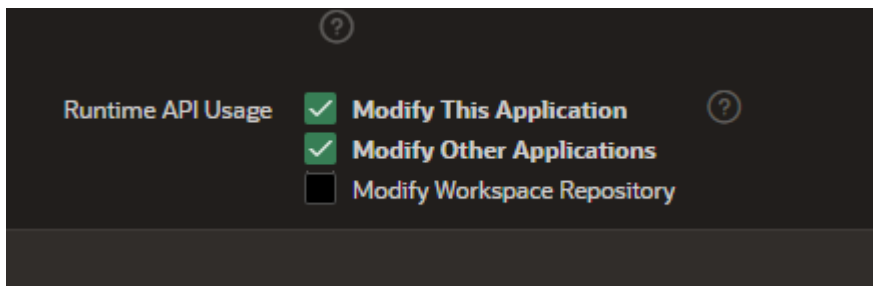
Security

Before form are deployed, they must by set « Published » state.



A form can be accessible either in a anonymous mode (no need to be authenticated) or in an authenticated mode.

because GFM Builder relies intensively on internal APEX API, some important flags have been set:



A compagnon Application called 'GFM Store' is provided as an example of an Apps store.

Appendices

Non documented APIs used in this project

- `wwv_flow_api.create_page`
- `wwv_flow_api.create_page_plug`
- `wwv_flow_api.create_page_button`
- `wwv_flow_api.create_page_branch`
- `wwv_flow_api.create_page_item`
- `wwv_flow_api.create_page_process`
- `wwv_flow_api.create_page_da_event`
- `wwv_flow_api.create_page_da_action`
- `wwv_flow_api.create_region_column`
- `wwv_flow_api.create_interactive_grid`



- `wwv_flow_api.create_ig_report_column`

APEX export API have been rewritten in 22.1 (`wwv_flow_imp`). That means that the previous API are not guaranteed to be working in the future, and therefore neither is this tool GFM Builder.

Plugins used in the project

- [FOEX Drag n Drop](#)
- [FOEX Redirect and Message Actions](#)

Author



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GPM Factory