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CUSTOMER RESOURCE OPTIONS

Supporting users throughout their entire journey of learning model-based systems engineering (MBSE) is central to Vitech's mission. For users looking for additional resources outside of this document, please refer to the links below. Alternatively, all links may be found at <u>www.vitechcorp.com/online-resources/</u>.



Webinars

Immense, on-demand library of webinar recordings, including systems engineering industry and tool-specific content.



Screencasts

Short videos to guide users through installation and usage of GENESYS.



A Primer for Model-Based Systems Engineering

Our free eBook and our most popular resource for new and experienced practitioners alike.



Help Files

Searchable online access to GENESYS help files.



Technical Papers

Library of technical and white papers for download, authored by Vitech systems engineers.



Technical Support

Frequently Asked Questions (FAQ), support-ticket web form, and information regarding email, phone, and chat support options.



INTRODUCTION

This document is an introductory guide for writing GENESYS[™] reports. To facilitate the explanation of the concepts, the following example reports are produced:

- Hello World a trivial report that displays the string "Hello World!"
- List of Concerns a report that displays project concerns, and
- Requirements with Concerns a report that displays concerns identified during requirements analysis.

The sample project, Geospatial Library, is the data source for the report outputs exhibited in this document. To achieve results consistent with the instructions herein, the reader should Import and Open the Geospatial Library sample project.

MANAGING REPORTS

The GENESYS reports are partitioned and stored in an arrangement of folders that are representative of those partitions. Expanding the *Reports* branch in the *Project Explorer* pane reveals the arrangement of GENESYS report folders. Clicking on a report folder will reveal its contents in the *Browser* window. For example, click on the *Common Subreports* folder and the *Browser* window displays the list of reports residing in *Common Subreports* folder.

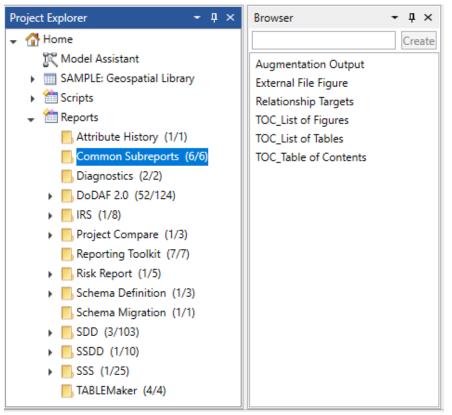


Figure 1: Common Subreports Folder

Prior to adding a new report, it is helpful to consider in which folder that report will reside. <u>The recommended</u> practice is to establish a new folder or folders to isolate user generated reports from the GENESYS base reports. Accordingly, for the reports generated in this document, a new folder has been created.



- In the *Project Explorer* pane, right-click on the *Reports* branch.
- Click on the New Folder command.
- Enter the folder name: "Toolkit".
- Click OK.

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Risk (1/1)		
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UseCase (7/7)		
Related Projects		
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A Notifications		
Schema		
Willities		
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Reports		
Repository: Local Project: SAMPLE: Geospati	al Library Username: Administrator Authentication Mode: GENESYS	

Figure 2: New Folder

The first report will simply display the static text string: "Hello World!" Add this report to the *Toolkit* folder.

- In the *Project Explorer* pane, right-click on the *Toolkit* folder.
- Click on the New Report Definition command.
- Enter the report name: "Hello World".
- Click OK.



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Project Compare (1/3)		
Reporting Toolkit (7/7) Risk Report (1/5)		
Risk Report (1/5) Schema Definition (1/.		
Schema Migration (2/		
▶ SDD (3/107)		
SSDD (1/10)		
▶ SSS (1/24)		
TABLEMaker (4/4)		
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► 🔁 UAF Reports (0/7)		
Comparison Local Drainett SAMDLE: Comparison Li	ihran/ Username: Administrator Authentication Mode: GENESVS	

Figure 3: Create the Hello World Report

The GENESYS Report Editor opens and presents an empty design surface. The design surface resembles a sheet of graph paper and resides in the center of the Report Editor window. *Controls* are used to display data. The available *Controls* are in the Report Designer's *Toolbox* window. A *Label* control is used to display plain text and is chosen to add the "Hello World!" string to the report.

- 1. This report will only display a single line of text. Therefore, the design surface will easily accommodate a larger font size. Prior to adding *Controls*, set the default font size (located in the Font section of the Report Editor's ribbon) to 12.
- 2. Drag the *Label* control from the *Toolbox* window and drop it on the Detail section of the design surface.
- 3. Double-click inside the Label control box and type "Hello World!"
- 4. Click on the design surface (outside of the Label control box).



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Figure 4: Inserting a *Label* Control

- 5. Click on the Save command in the Report Editor ribbon to save the effected changes.
- 6. Click on the *Preview* command in the Report Editor ribbon to view the report's output. (*The output should consist of a single page containing the string "Hello World!"*)
- 7. Close the Preview window.
- 8. Exit the Report Editor.

At this point, the *Hello World* report exists in the *Toolkit* folder of the repository. In the browser window, select the *Hello World* report to open its Property Sheet. Notice that GENESYS initialized the report's *Description* attribute with a default text string.



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Figure 5: Default Report Description

A report's description is editable. Open the GENESYS text editor by clicking on the pencil icon adjacent to the *Description* attribute text box. Use the text editor to replace the default description with a more representative explanation of the report. The updated report description is shown below.



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Repository: Lo	cal Project: S	AMPLE: 0	Geospatial	Library U	sername: A	dministra	tor Auth	entication Mode	NESYS	

Figure 6: Hello World Report with updated Description

The GENESYS *Export* and *Import* commands provide the means for backing up and restoring report folders. The *Export* produces a *gnsx* file that is external to the GENESYS repository. The gnsx file is selected during an *Import* to restore the report folder and its contents.

CONSTRUCTING REPORTS

This section presents guidance for incorporating GENESYS repository data into reports. The instruction emphasizes how to locate and display the GENESYS data objects of interest. In general, *Bands* are used to retrieve data and *Controls* are used to display data. Binding is the technique that connects a *Control* to the data captured in a *Band*.

Locating the Data – Detail Report Bands

The GENESYS Report Designer utilizes *Detail Report Bands* to traverse and iterate over the structure and hierarchy of the GENESYS[™] repository data. Assembling an organized sequence of *Detail Report Bands* enables the reporting tool logic to navigate the repository to the data of interest. As depicted in the following diagram, similarities can be visualized between *Detail Report Bands* and the GENESYS *Project Explorer* and *Browser* panes.



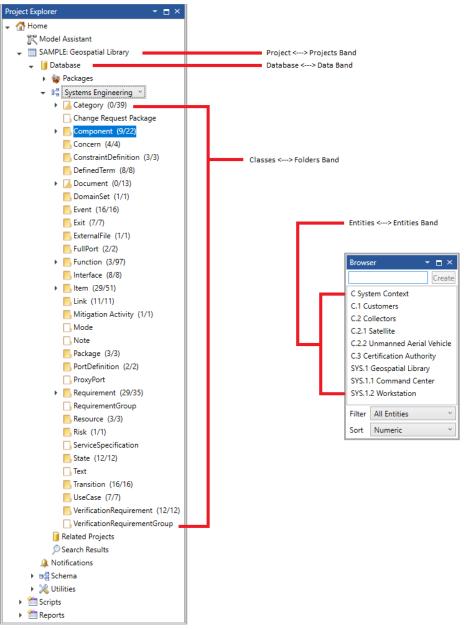


Figure 7: Detail Report Bands and GENESYS Project Explorer and Browser Panes

The iterative capability of *Detail Report Bands* enables the reporting tool logic to process all, or a subset of, the objects contained in the repository structure associated with the particular band. (For example, the *Folders* band iterates over a project's folders.)



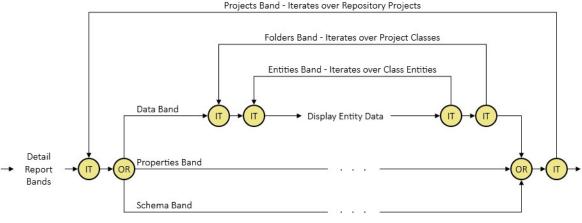


Figure 8: Report Band Iteration

Displaying the Data – Controls and Data Binding

Introduced in section 1, *Controls* are used to display data. While the *Hello World* report introduced static content, the reports that follow will feature dynamic content derived from the GENESYS repository data.

For a *Control* to represent GENESYS repository data, the *Control* must be associated with a specific type of repository object (e.g., folder, entity, attribute, etc.) The technique of Data Binding defines the link between a *Control* and a repository object retrieved in a *Band*.

List of Concerns Report

The *List of Concerns* report will evolve using a staged approach. At each stage, content is added or revised and subsequently, the report's output is generated and verified. The conclusion of this process will yield a report that displays the project's open concerns together with selected attributes defined for those concerns.

Stage 1 – Display the Project Name

Start simply by displaying the Project name.

- 1. In the *Toolkit* folder, create a report named "List of Concerns".
- 2. Verify that the report is open for editing.
- 3. This report does not display a large amount of text. Therefore, the design surface will easily accommodate a larger font size. Prior to adding *Controls*, set the default font size (located in the Font section of the Report Editor's ribbon) to 12.
- 4. Insert a Projects band within the Detail band.
 - Right-click in the *Detail* band's design surface space,
 - Expand the Insert Detail Report sub-menu, and
 - Click on the "Projects" identifier.



Detail	Edit and Reorder Bands	
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=	Add Sub-Band Insert Band	
	Insert Detail Report	I Unbound
	Zoom •	The second secon
	Properties	

Figure 9: Inserting a *Projects* Band

5. The Project name is simple text, so drop a *Label* control within the *Projects* band space on the design surface.

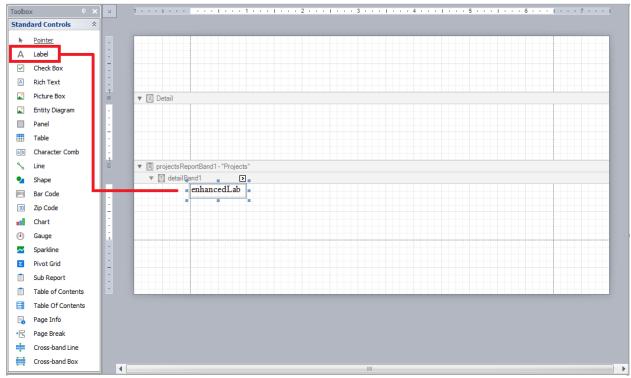


Figure 10: Inserting a Label Control into the Projects Band

- 6. Bind the *Label* control to the *Project* object.
 - Expand the *Projects* band in the *Field List* window.
 - Drag the *Project* item from the *Field List* and drop it onto the *Label*.
 - Observe that the text inside the Label changes to "[Project]".



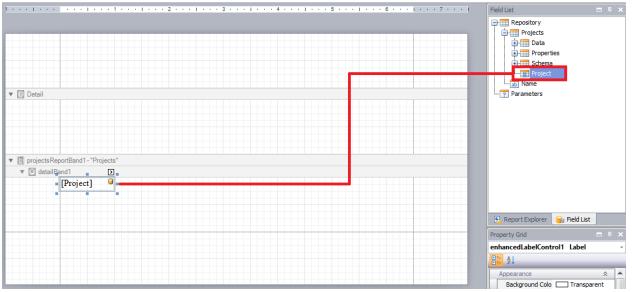


Figure 11: Binding a Label Control to the Project Object

7. Save and then Preview the report.

The report output (shown below) consists of a single page with the Project name appearing in the upper left corner of the page.



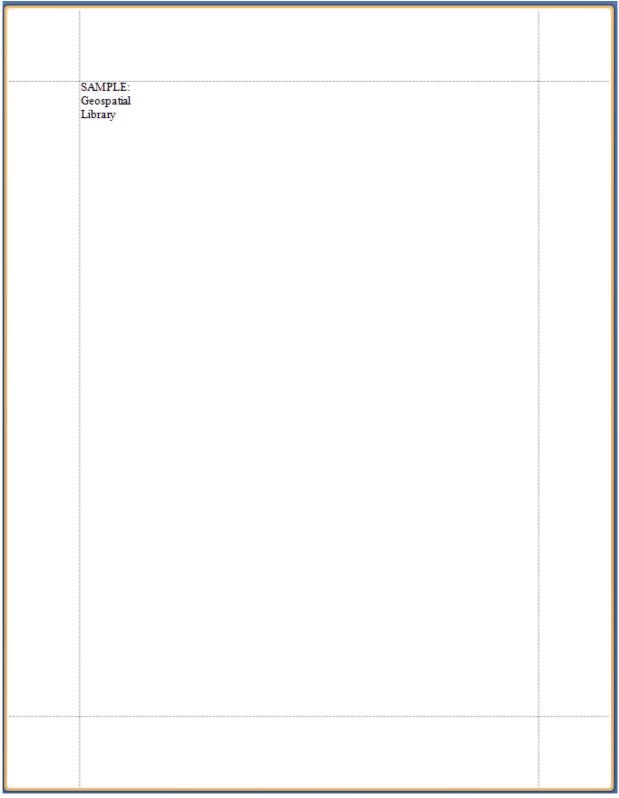


Figure 12: List of Concerns Output – Stage 1



Why didn't the Projects band iterate over all projects in the repository?

(Note: If repository being used does not contain additional projects, import the Fast Food Sample project and preview the report again.)

The *Projects* collection associated with the *Projects* band identifies the repository projects over which the *Projects* band will iterate. The default value of the *Projects* collection is "Current"—meaning that the *Projects* band will only iterate over the active project. The *Projects* collection can be viewed via the Smart Tag associated with the *Projects* band.

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Smart	Tag	
▼	Detail Report Tasks Edit and Reorder Bands	
[rijeci] -	Projects	(Collection)
	Set Parameters	SAMPLE: Geospatial Library
	Data Source Data Member	
	Data Adapter Filter String	(none) ~
	Detail Count at Design Time	
	Formatting Rules	(Collection) ····
	Page Break	None •

Figure 13: Projects Band Smart Tag

When *no* projects are selected (i.e., checked) in the *Projects* collection, the *Projects* band will iterate over all repository projects.

Stage 2 – List the Project Classes

Extend the report to the list the names of the project's Classes.

- 1. Add the *Data* band.
 - Right-click in the detail section of the *Projects* band,
 - Expand the Insert Detail Report sub-menu, and
 - Click on the "Data" identifier.



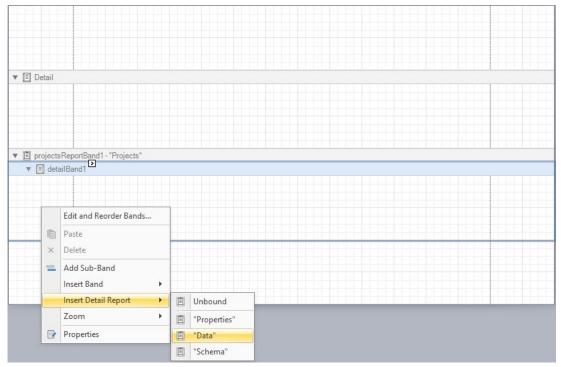


Figure 14: Inserting a Data Band

- 2. Add the *Folders* band.
 - Right-click in the detail section of the Data band (i.e., "Projects.Data"),
 - Expand the Insert Detail Report sub-menu, and
 - Click on the "Folders" identifier.



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Figure 15: Inserting a *Folders* Band

- 3. The Folder name is simple text, so drop a *Label* control within the *Folders* band space on the design surface.
- 4. Bind the *Label* control to the *Folder* object.
 - Expand the *Data* band in the *Field List* window.
 - Expand the *Folders* band in the *Field List* window.
 - Drag the *Folder* item from the *Field List* and drop it onto the *Label*.
 - Observe that the text inside the *Label* changes to "[Folder]".



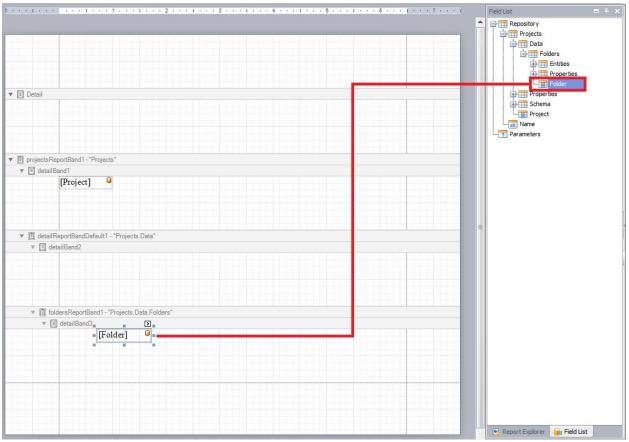


Figure 16: Binding a Label Control to the Folder Object

5. Save and then Preview the report.

The report output (first page shown below) consists of five pages containing the Project name followed by a complete list of the project's *Class* names.



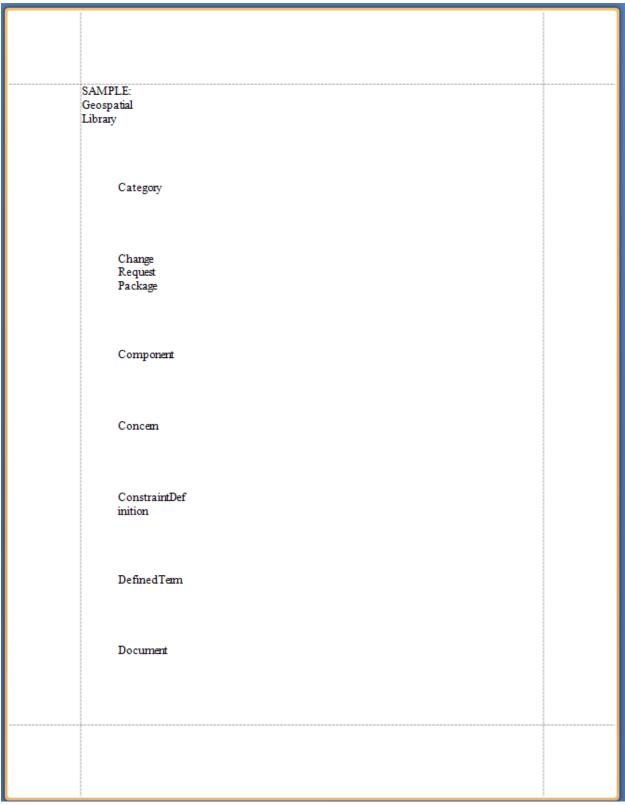


Figure 17: List of Concerns Output – Stage 2



Is there a way to avoid the word wrapping on the Project and Folder names?

Yes. The size of a *Control* is adjustable via its handles. Eliminate the word wrapping applied to the Project and Folder names by increasing the width of those *Label* controls. (For example, click on the Project name Label and drag its right-side, middle handle to the right.)

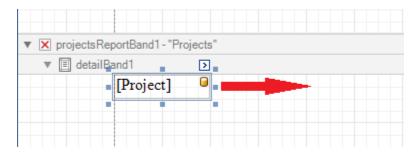


Figure 18: Adjusting the Size of a Control

Stage 3 – Restrict the Folder Iteration

Since the *List of Concerns* report is exclusively interested in the **Concern** class entities, it is unnecessary to iterate over the entire collection of Project classes. Limit the iteration of the *Folders* band to the **Concern** class.

- Click on the Smart Tag of the *Folders* band (i.e., "Projects.Data.Folders").
- Open the *Folders* collection and check the *Concern* box.
- Click on the *Folders* band grid space.



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		Concern ConstraintDefinition	
	Data Member		-
	Data Adapter	(none) ·	
	Filter String		
	-		
	Detail Count at Design Time	e 0 🇘	
	Formatting Rules	(Collection) ····	
	Page Break	None -	

Figure 19: Restricting the Folders Band Iteration

Save and the Preview the report. Notice the change in the report's output (shown below); the class list is comprised of a single class name: **Concern**.



 SAMPLE: Geospatial Library	
Concern	

Figure 20: List of Concerns Output – Stage 3



Stage 4 – Display the Class Entities

Expand the report to include the names of the entities within the **Concern** class.

- 1. Add the *Entities* band.
 - Right-click in the detail section of the Folders band (i.e., "Projects.Data.Folders"),
 - Expand the Insert Detail Report sub-menu, and
 - Click on the "Entities" identifier.

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▼ 🗐 detai	IRen	ortBandDefault1 - "Projects.Dat	a"										
▼ 🗐 d	letail	IBand2											
	1								-	_		-	
V 🗐 fe	older	rsReportBand1 - "Projects.Data.I	Folders	-			 					_	
	l d	rsReportBand1 - "Projects.Data. letailBand3											
		Edit and Reorder Bands											
		Eart and Reorder bands											
	Ē.	Paste											
	×	Delete											
			-										
	1	Add Sub-Band			manufacturine process					m.donana	ļ		
		Insert Band											
		Insercodita P	-										
		Insert Detail Report	Ē	Unbo	und								
L L			1										
		Zoom 🕨	Ē	"Prop	perties"								
	-						_		1	_			
		Properties	Ē	"Entit	ties"								
				-									

Figure 21: Inserting an Entities Band

- 2. The Entity name is simple text, so drop a *Label* control within the *Entities* band space on the design surface.
- 3. Bind the *Label* control to the *Entity* object.
 - Expand the *Entities* band in the *Field List* window.
 - Drag the *Entity* item from the *Field List* and drop it onto the *Label*.
 - Observe that the text inside the Label changes to "[Entity]".



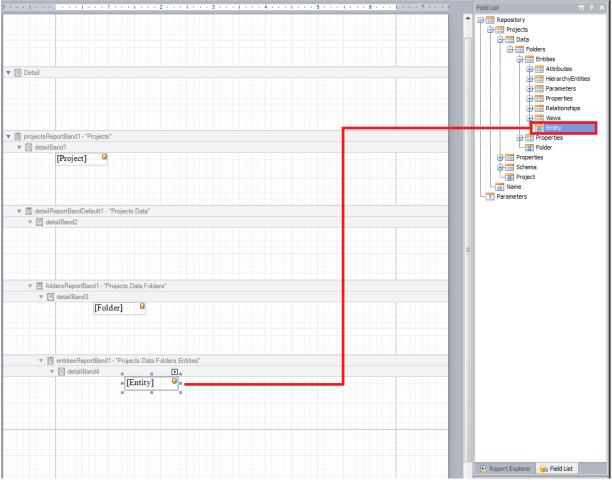


Figure 22: Binding a Label Control to the Entity Object

4. Save and then Preview the report.

The report output (shown below) consists of a single page that includes the Project name, **Concern** class name, and the names of the four **Concern** entities in the Geospatial Library project.



SAMPLE: Geospatial Library	
Concern	
Criteria for	
Determining	
Determining Certified User	
Criteria for	
Self	
Assessment	
Determining	
the Means of	
Certifying a User	
User	
Media of	
Request	
1	

Figure 23: List of Concerns Output - Stage 4



Is there a way to compress the vertical spacing of the report output?

Yes. The appearance of the design surface is significant as it reflects the report's output. When the report output is generated, each iteration of a band consumes space equivalent to that which is allocated to that band on the design surface. Minimizing the unused space on the design surface will condense a report's output.

The vertical spacing associated with a band is adjusted by dragging the band's bottom border. Eliminate the unused space in the top four bands by dragging their bottom borders upward. (Additionally, remove the word wrapping applied to the **Concern** entity names by widening the associated *Label*.)

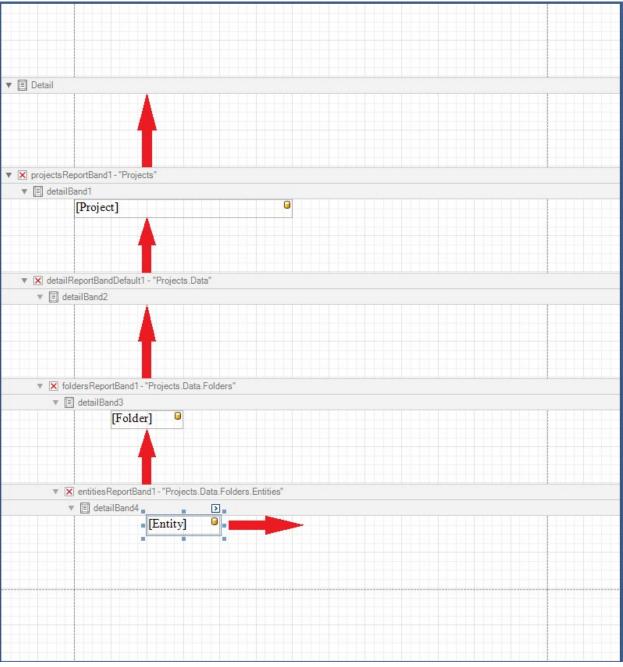


Figure 24: Compressing Vertical Spacing of Report Output



Save and preview the report. Note the condensed report output (shown below).

 SAMPLE: Geospatial Library	
Concern	
Criteria for Determining Certified User	
Criteria for Self Assessment	
Determining the Means of Certifying a User	
Media of Request	

Figure 25: List of Concerns Output – Condensed Spacing



Stage 5 – Incorporate Entity Attributes

Augment the report to include each entity's Description, Importance and Status attributes.

Within the *Entities* band space on the design surface, insert three additional *Label* controls (all bound to the Entity object).

🔻 🗐 Detail				
 projectsReportBand1 - "Projects" 				
▼ 🗐 detailBand1				
[Project]				
▼ 🔀 detailReportBandDefault1 - "Proje	ects Data"			
▼				
 IndersReportBand1 - "Project 	e Data Foldere"			
	S.Data.Folders			
▼ 🗐 detailBand3	0			
[Folder]				
▼ 💌 entitiesReportBand1-"Pr	ojects.Data.Folders.Entities	5"		
▼ 🗐 detailBand4				
[Ent	ity]	Q		
	[Entity]		G	
	[Entity]	[Entity]	•	
Σ				

Figure 26: Augmenting Report to Include Description, Importance, and Status

The four *Label* controls in the *Entities* band have identical binding and appear to be the same. In fact, a preview of the report displays each **Concern** entity name four times.

The process of binding a data object to a *Label* control establishes the object's name as the *Label's* default representation of that object. Differentiate the *Label* controls by changing their representation of the bound object.

- Select the *Label* control in the middle row of the *Entities* band.
- Click on its Smart Tag.
- Click on the ellipses to open the *Entity Representation* definition.



Label Tasks		
Entity Representation		
Text	enhancedLabelControl3	
Data Binding	Repository - Projects.Data.Fol	-
Format String		
Summary	None	••••
Angle	0	
Formatting Rules	(Collection)	••••
Can Grow		
Can Shrink		
 Multiline Word Wrap 		

Figure 27: Entity Representation Definition

- In the *Field* column, change the selected attribute from "name" to "description".
 Click "OK" to complete the change.

🕒 Entit	y Representation				_		×
Insert	t Remove		En	tity Representation			1
Prefix	Туре	Field		Extended Field			Suffix
	Entity Attribut 🕤	name	v				
		dataType	^				
		dateClosed					
		decision					
		delay					
		delayUnits					
		dependentVariables					
		description)				
		direction		Clear	OK	0	ancel
		directionality		Clear	UK		ancei
		documentDate					
		documentNumber					
		documentOverview					
		documentScript					
		dueDate					
		duration					
		durationUnits					
		effects					
		endDate	\sim				

Figure 28: Entity Representation - Description Attribute



- Open the Entity Representation for the left *Label* control in the bottom row of the *Entities* band.
- In the *Prefix* column, add the string "Importance: ".
- In the Field column, change the selected attribute from "name" to "importance".
- Click "OK" to complete the change.

Entity Representation				_		×
Insert Remove		En	tity Representation			1
Prefix Type	Field		Extended Field			Suffix
Entity Attribut ~	name	Ŷ				
	exitLogic	~	1			
	expression					
	externalFilePath					
	fields					
	governmentCategory					
	guard					
	handlingApproach					
	identification		Clear	ОК	6	ancel
	importance		Clear	Л		ancei
	incentivePerformanceParameter					
	independentVariables					
	initialAmount					
	isBehavior					
	keyPerformanceParameter					
	label					
	laborHours					
	level					
	likelihood	\sim				

Figure 29: Entity Representation - Importance Attribute

In similar fashion, change the representation of the right *Label* control in the bottom row of the *Entities* band to display the "status" *Field* with a *Prefix* of "Status: ".

Save and then Preview the report. The report output is a single page that contains an alphabetic listing of the four **Concern** entities with their *Description*, *Importance*, and *Status* attributes.



SA	AMPLE: Geospatia	Library		
	Concern	2		
	Criteria	for Determining Certified User	t i i i i i i i i i i i i i i i i i i i	
			e system shall accept information requests he criteria that define a certified user?	
		Importance: Essential	Status: Closed	
	Criteria	for Self Assessment		
		What are the criteria to be used performance?	to assess the quality of system's	
		Importance: Important	Status: Open	
	Detem	uning the Means of Certifying a	User	
		The requirement states that the	e system shall accept information requests uld the Certification Authority be	
		Importance: Critical	Status: Open	
	Media	ofRequest		
			e system shall a ccept information requests he request media that the system must be	
		Importance: Essential	Status: Closed	

Figure 30: List of Concerns Output – Stage 5



Stage 6 - Sort the Entities

The *Sort Block* assigned to the *Entities* band determines the order in which its entities are displayed. By default, the entities are sorted alphabetically by name. For this report, a different *Sort Block* is required as the preferred ordering of the **Concern** entities is by the value of their *Importance* attribute. The *Sort Block* is accessible through the band's Smart Tag.

- Open the Smart Tag of the *Entities* band.
- Expand the Sortblock drop-down list and choose the Concern Importance sort block.

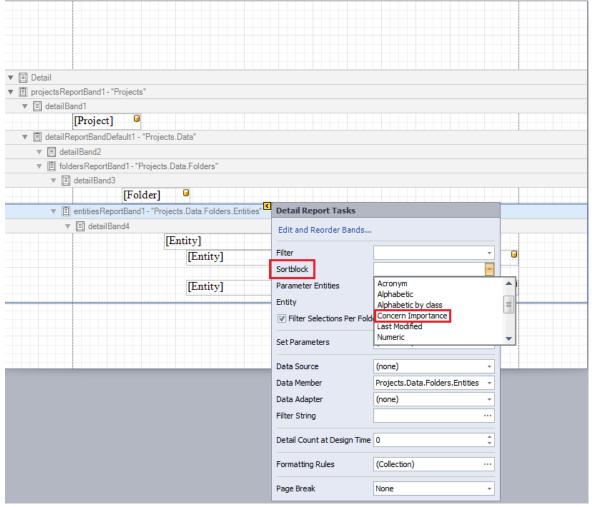


Figure 31: Sorting the Entities Band Output

Save and preview the report. Observe that the **Concern** entities are listed in order by their *Importance* attribute.



 SAMPLE: Geospatia	ıl Library	
Concern		
Deten	nining the Means of Certifying	g a User
		the system shall accept information requests would the Certification Authority be
	Importance: Critical	Status: Open
Criteri	a for Determining Certified U	ser
		the system shall accept information requests re the criteria that define a certified user?
	Importance: Essential	Status: Closed
Media	ofRequest	
		the system shall accept information requests re the request media that the system must be
	Importance: Essential	Status: Closed
Criter	a for Self Assessment	
	What are the criteria to be us performance?	ed to assess the quality of system's
	Importance: Important	Status: Open

Figure 32: List of Concerns Output – Sorted by Importance



Stage 7 – Filter the Entities

The *Filter* assigned to the *Entities* band determines which entities are displayed. All entities are displayed when no *Filter* is assigned. For this report, a *Filter* is needed as only the open concerns are to be displayed. The *Filter* is accessible through the band's Smart Tag.

- Open the Smart Tag of the *Entities* band.
- Expand the Filter drop-down list and choose the "Open Concerns" filter.

▼										
▼ I projectsRep	ortBand1 - "Proje	cts"								
🔻 🔳 detailBar										
	[Project]									
▼ 🗐 detailRe	portBandDefault	1 - "Projects	.Data"							
🔻 🔳 deta										
	ersReportBand1	- "Projects.D	ata.Folders"							
▼ (detailBand3									
		older]			Detail Report Tasks					
	entitiesReportBa	ind I - "Projec	ts.Data.Folde	rs.Entities						
· · · · · · · · · · · · · · · · · · ·	E detailBand4 [Entity]				Edit and Reorder Bands					
		L.	[Entity]		Filter					
			[Lintery]		Sortblock	High Risks				
			[Entity]		Parameter Entities	No Descriptions Open Concerns	j			
					Entity	Performance Requirements				
					Filter Selections Per Fold	TBD/TBR Descriptions Unaddressed Requirements	•			
					Set Parameters	(Collection) ···				
					Data Source	(none)	-			
					Data Member	Projects.Data.Folders.Entities	•			
					Data Adapter	(none)	-			
					Filter String		•			
					Detail Count at Design Time	0				
					Formatting Rules	(Collection)	•			
					Page Break	None	•			

Figure 33: Filtering the Entities Band Output

Save and preview the report. Observe that only open **Concern** entities are displayed.



SAI	MPLE: Geospatial	Library			
	Concern	-			
	Determ	ining the Means of Certi	fying a User	:	
		The requirement states t	hat the syst	em shall accept information e Certification Authority be	requests
		Importance: Critical		Status: Open	
	Criteria	for Self Assessment			
			e used to as	ssess the quality of system's	
		Importance: Important		Status: Open	
					1

Figure 34: *List of Concerns* Output – Filtered for Open Concerns



Requirements with Concerns report

The *Requirements with Concerns* report introduces several new features of the Report Editor. These include the *Relationships* band, the *Entity Diagram* control, and the *Property Grid*. Once again, the report is developed in stages. The culmination of this process will yield a report that identifies the project requirements that generate concerns and include the hierarchy diagrams of those requirements.

Stage 1 – Create the report.

Create the report and lay the foundational bands.

- 1. In the *Toolkit* folder, create a report file named "Requirements with Concerns".
- 2. Verify that the report is open for editing.
- 3. Insert a Projects band within the Detail band.
- 4. Insert a *Data* band within the *Projects* band.
- 5. Insert a *Folders* band within the *Data* band.
- 6. Insert an *Entities* band within the *Folders* band.
- 7. Insert a *Relationships* band within the *Entities* band.
- 8. For all bands, except the *Relationships* band, eliminate the allocated design surface space.

▼											
▼ X projectsReportBand1 - "Projects"											
▼											
 detailReportBandDefault1 - "Projects.Data" 											
▼ 🗐 detailBand2											
Interstation of the second											
▼ 🗐 detailBand3											
entitiesReportBand1 - "Projects.Data.Folders.Entities"											
▼ 🗐 detailBand4											
🔻 🗙 relationshipsReportBand1 - "Projects.Data.Folders.Entities.Relationships"											
▼ 🗐 detailBand5											

Figure 35: Foundational Bands for the Requirements with Concerns Report

This report is tracing the *generates* relationship of **Requirement** entities to determine which, if any, produce concerns. As such, the *Folders* band only needs to examine the **Requirement** class folder, and the *Relationships* band only needs to consider the *generates* relation.

9. Confine the *Folders* band iteration to the **Requirement** class. Open the Smart Tag of the *Folders* band and check the *Requirement* box.



- 10. Constrain the *Relationships* band iteration to the *generates* relation.
 - Click on the Smart Tag of the *Relationships* band (i.e., "Projects.Data.Folders.Entities.Relationships").
 - Open the *Relationships* collection and check the generates box.
 - Click in the *Relationships* band grid space.

▼			
▼ I projectsReportBand1 - "Projects"			
▼ II detailBand1			
▼ I detailReportBandDefault1 - "Projects.Data"			
▼ II detailBand2			
 ♥ I foldersReportBand1 - "Projects.Data.Folders" ♥ I detailBand3 			
♥ III entitiesReportBand1 - "Projects.Data.Folders.Entities"			
▼			
 relationshipsReportBand1 - "Projects.Data.Folders.Entities.Relationships 	C Detail Report Tasks		
▼ II detailBand5	Edit and Reorder Bands		
			- 1
	Relationships	(Collection)	
	Targets	forms	-
	Sortblock	 generalization of generated by 	=
		generates	
	Set Parameters	grouped by	-
	Data Source	(none) -	
	Data Member	Projects.Data.Folders.Entities.I -	1
	Data Adapter	(none) -	18
	Filter String		1
	-		
	Detail Count at Design Time	0 ‡	
	Detail Count at Design Time Formatting Rules		

Figure 36: Restricting the *Relationships* Band Iteration

Stage 2 – Add Requirements with Concerns matrix.

This report does not display a large amount of text. Therefore, the design surface will easily accommodate a larger font size. Prior to adding *Controls*, set the default font size (located in the Font section of the Report Editor's ribbon) to 12.

In the *Relationships* band detail space, drop and resize four *Label* controls in a pattern that forms a twocolumn by two-row matrix. The top row of the matrix serves as its header. Set the text in the left *Label* to "<u>Requirement</u>" and the text in the right *Label* to "<u>Concern</u>".

Dynamic text is rendered by the *Label* controls of the second row. Specifically, the *Label* controls are used to display the name of a **Requirement** entity and the name(s) of any **Concern** entities that are generated by the **Requirement** entity. Bind the *Label* control in the left column to the *Entity* object and the *Label* control in the right column to the *Relationship Target* object.



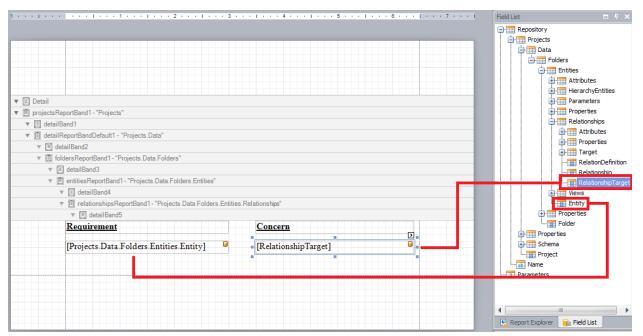


Figure 37: Binding Label Controls to Entity and Relationship Target Objects

Save and Preview the report. The first page of the report output (shown below) discloses some issues with the report. One issue is that the requirements that do not generate concerns are being displayed.



<u>Requirement</u>	<u>Concern</u>
ccept Media of Requests	
Requirement	Concern
Accept Requests	Media of Request
Requirement	Concern
Accept Requests from Certified Customers	Criteria for Determining Certified User
Requirement	Concern
Accept Requests from Certified Customers	Determining the Means of Certifying a User
lequirement	Concern
Adding Imagery Products to Inventory	
Requirement	Concern
Assess Self Performance	Criteria for Self Assessment
Requirement	Concern
Availability	
Requirement	Concern
Certify Customers	
Requirement	Concern
ontinuous Support	

Figure 38: Requirements with Concerns Output – All Requirements



To remove such requirements from the report, the *Print when Data Source is Empty* option of the *Relationships* band needs to be disabled. This print option is accessible through the Report Designer's *Property Grid*.

- Select the *Relationships* Band.
- In the Property Grid, expand the Report Print Options property.
- Set the Print when Data Source is Empty option to "No".

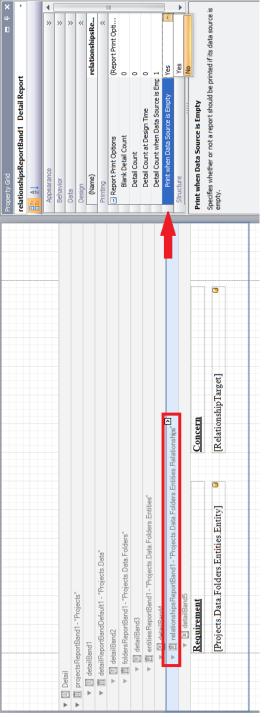


Figure 39: Relationships Band Property - Print When Data Source is Empty



Save and preview the report. The report output (shown below) has been reduced to a single page containing only the requirements that generate concerns.

<u>Requirement</u>	Concern
Accept Requests	 Media of Request
<u>Requirement</u>	<u>Concern</u>
Accept Requests from Certified Customers	Criteria for Determining Certified User
Requirement	Concern
Accept Requests from Certified Customers	Determining the Means of Certifying a User
Requirement	Concern
Assess Self Performance	Criteria for Self Assessment

Figure 40: *Requirements with Concerns* Output – Concern Producing Requirements Only



Further simplification of this report can be achieved by excluding repetitive **Requirement** entity names. (*Accept Requests from Certified Customers*, in this case.) The *Label* property—*Process Duplicates Mode*— defines the processing for repeated values of the *Label*. This behavior property is accessible through the Report Designer's *Property Grid*.

- Select the Label bound to the Entity object.
- In the Property Grid, set the Process Duplicates Mode property value to "Suppress and Shrink".



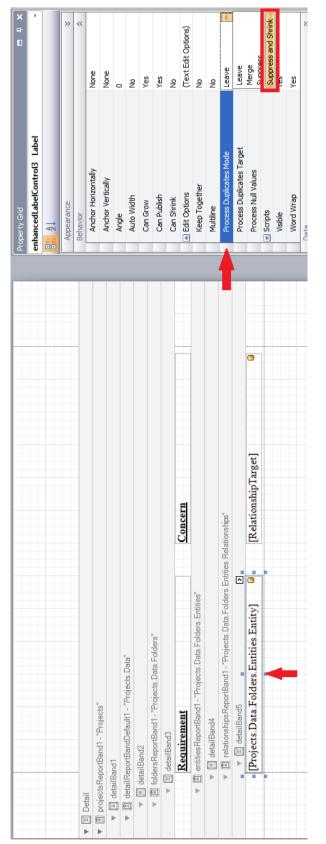


Figure 41: Label Control Property - Process Duplicates Mode



The display of the matrix header is also replicated for repetitive **Requirement** entity names. Correct this by setting the *Process Duplicates Mode* property of the matrix header *Label* controls to the "Suppress and Shrink" value.

Save and preview the report. The report output (shown below) no longer repeats the Accept Requests from Certified Customers Requirement entity.



<u>Requirement</u>	Concern
Accept Requests	Media of Request
Requirement	Concern
Accept Requests from Certified Customers	Criteria for Determining Certified User
	Determining the Means of Certifying a User
Requirement	Concern
Assess Self Performance	Criteria for Self Assessment

Figure 42: Requirements with Concerns Output – Sans Repeated Requirement Entity Names



Stage 3 – Add Hierarchy diagrams.

Supplement this report by incorporating the Hierarchy diagrams for each **Requirement** entity displayed in the matrix.

To prevent these diagrams from disrupting the matrix of a requirement that generates multiple concerns, another *Relationships* band is inserted within the existing *Entities* band. (Don't forget to constrain this *Relationships* band iteration to the "generates" relation.)

The *Entity Diagram* control is used to display GENESYS diagrams. Drop an *Entity Diagram* control into the **relationshipsReportBand2** band. Bind the control to the *Entity* object. Finally, the diagram type needs to be assigned to the *Control*. Open the Smart Tag for the *Entity Diagram* control and set the *Diagram Type* to "Hierarchy".

V 🗉 Detail				
▼ I projectsReportBand1 - "Projects"				
▼ 🗐 detailBand1				
▼ 🗐 detailReportBandDefault1 - "Pro	jects.Data"			
▼ 🗐 detailBand2				
▼ 🗐 foldersReportBand1 - "Proje	cts.Data.Folders"			
▼ 🗐 detailBand3				
Requirement		Con	icern	
 entitiesReportBand1 - "F 	Projects.Data.Folders	.Entities"		
▼ 🗐 detailBand4				
▼ 🗐 relationshipsReport	Band1 - "Projects.Dat	a.Folders.Entities.Relationshi	ips"	
▼ 🗐 detailBand5				
[Projects.Data.Fol	ders Entities Ent	tity] 🔍 [Rela	ationshipTarget]	
▼ 🗐 relationshipsReportBan	d2 - "Projects.Data.Fo	olders.Entities.Relationships"		
▼ 🗐 detailBand6				
	Picture Box Tasks	5		
	Image	(none)		
	Data Binding	(none)	·	
	Entity			
	Diagram Type	Activity		
	Hierarchy Definition	FFBD		
	· · ·	FlowInternalBlock		
	Rule Set Option	Hierarchy		
	Rule Set	IDEF0		
		IDEF0A0		
	Presentation Mode	InterfaceBlock		
	Formatting Rules	InterfaceN2		
		InternalBlock		
	Sizing	Normal	•	
	Image Alignment	Default	*	

Figure 43: Adding a Hierarchy Diagram

Include a caption for the Hierarchy diagram by dropping a *Label* control under the *Entity Diagram* control. Bind the *Label* control to the *Entity* object and set the *Suffix* field of the *Label* control's *Entity Representation* to the string "Hierarchy Diagram".

Ensure adequate sizing of the rendered diagrams by horizontally stretching the *Entity Diagram* control so that it occupies the entire space between the design surface margins. Accordingly, the diagram's caption will be centered under the diagram. Therefore, horizontally stretch the *Label* control so that it occupies the



entire space between the design surface margins and use the Font controls in the Report Editor ribbon to center the text of the *Label* control.

Avoid the problems discovered in the previous development stage. First, disable the *Print when Data Source is Empty* option of the **relationshipsReportBand2** band to prevent display of Hierarchy diagrams for **Requirement** entities that don't generate concerns. Second, exclude repetitive display of the Hierarchy diagram for **Requirement** entities that generate multiple concerns (e.g., *Accept Requests from Certified Customers*). For both the *Entity Diagram* control and the *Label* control, set the *Process Duplicates Mode* property value to "Suppress and Shrink".

To improve the data segregation of the report output, set the *Page Break* property of the **relationshipsReportBand2** band to the value "After the Band".

- Click on the Smart Tag of the relationshipsReportBand2 band.
- Open the *Page Break* collection and select the "After the Band" value.
- Click in the **relationshipsReportBand2** band grid space.

Detail						
projectsReportBand1 - "	Projects"					
▼ 🗐 detailBand1						
▼ I detailReportBandDe	fault1 - "Projects.Data"					
▼ 🗐 detailBand2						
-	and1 - "Projects.Data.Folders	s"				
▼ 🗐 detailBand3						
Require	<u>ment</u>		Conc	<u>ern</u>		
🔻 🧾 entitiesRep	ortBand1 - "Projects.Data.Fo	Iders.Entities"				
🔻 🗐 detailB	and4					
🔻 🧵 relation	shipsReportBand1 - "Project	s.Data.Folders.Entities.Rel	lationship	s"		
▼ 🗐 det	ailBand5					
	Data Folders Entities			tionshipTarget]		
🔻 🗐 relationship	osReportBand2 - "Projects.Da	ata.Folders.Entities.Relatio	onships" <	Detail Report Tasks		
▼ 🗐 detailB				Edit and Reorder Bands		
				Relationships	(Collection)	
		[Projects.Data.Folder	s.Entities		(Collection)	-
				Sortblock	Alphabetic by class	-
				Set Parameters	(Collection)	
				Data Source	(none)	•
				Data Member	Projects.Data.Folders.Entities.I	
					-	
				Data Adapter	(none)	-
				Filter String		
				Detail Count at Design Time	0	÷
				Formatting Rules	(Collection)	
			-	Page Break	None	
					None	
					Before the Band	
						o Eire
					Before the Band, Except for th After the Band	e First

Figure 44: Relationship Band's Page Break Property



Save and preview the report. The report output (shown below) is three pages and includes the Hierarchy diagrams for each **Requirement** entity.

<mark>Requirement</mark> Accept Requests	<u>Concern</u> Media of		
hier Accept Requests			
generates	ests		
Request Concern results in R.2.1.1.1 Accept Media	refined by refined by R21113 Media of Media of Requirement	refined by refined by R.2.1.1.4 Media of Media of	
of Reguests Requests Har Requirement Requirement	Requests Ver Requirement Organization	Requests Vie Requirement Date: 4/10/2018	
Ac	cept Requests Hierarchy Diag	gam	

Figure 45: Requirements with Concerns Output - Page 1



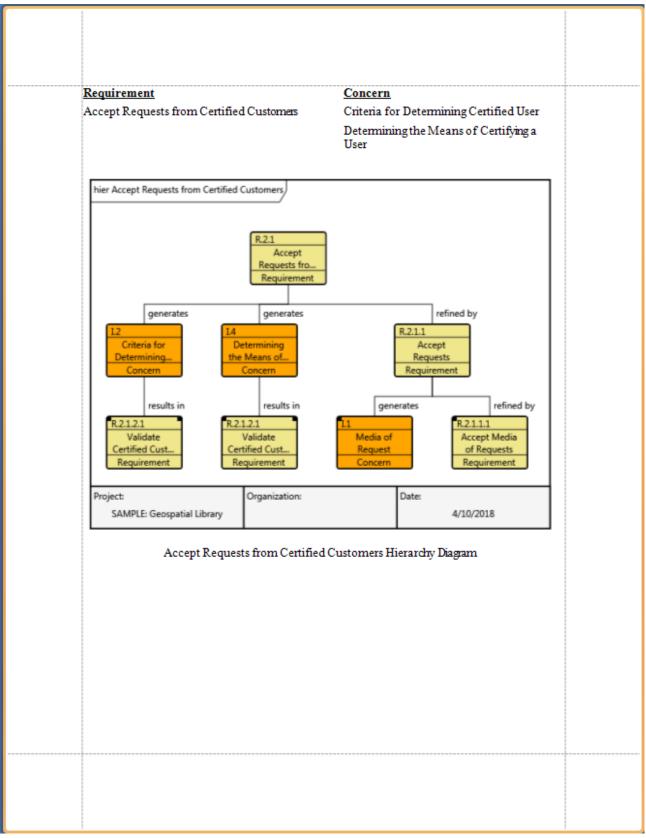


Figure 46: Requirements with Concerns Output – Page 2



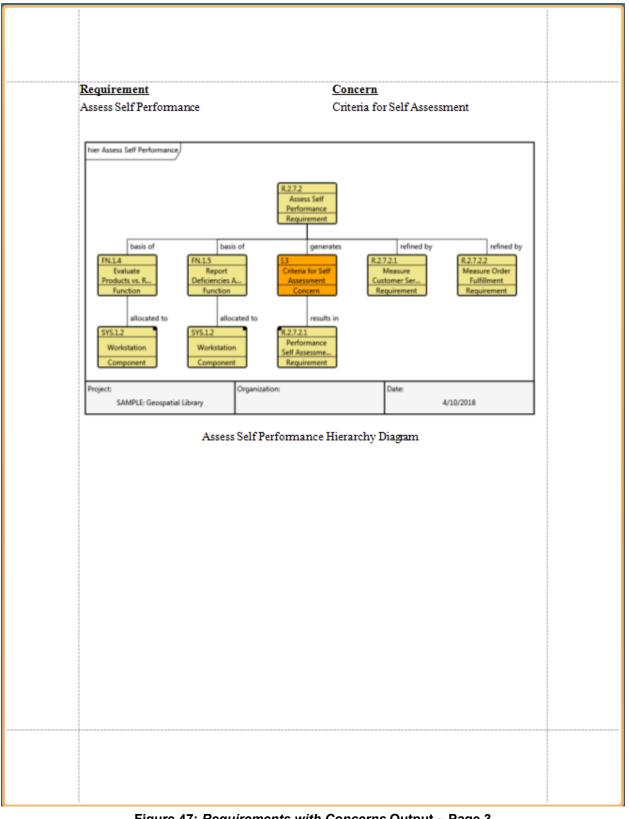


Figure 47: *Requirements with Concerns* Output – Page 3



FINISHING TOUCHES

This section demonstrates ways to apply some structure to the *Requirements with Concerns* by integrating page numbering and a Cover Page into the report.

Page Numbering

To highlight the inclusion of page numbers, it is helpful to simplify the design surface by collapsing the bands used to produce the report data. Collapsing and expanding a band is accomplished by clicking on the *arrowhead* associated with the band.

Click on the arrowhead of the *Projects.Data* band to collapse it. (Notice that the arrowhead points to the right to indicate that the band is collapsed.)

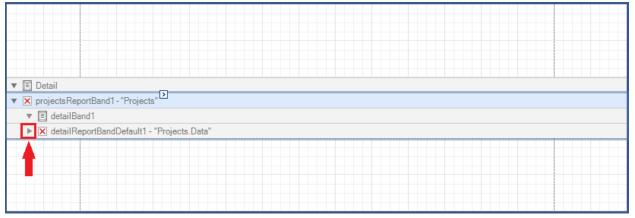


Figure 48: Collapsing Report Bands

GroupHeader and *GroupFooter* bands are used to delineate a grouping of the report's data bands. Page numbering can be incremented over the output produced by such a grouping.

Insert the GroupHeader band.

- Right-click on the *Projects* band,
- Expand the *Insert Band* sub-menu, and
- Click on the GroupHeader identifier.



V Detail				
ProjectsReportBand1 - "Projects" DetailBand1 DetailBand1 DetailReportBandDefault1 - "Project	i ×	Edit and Reorder Bands Paste Delete		
		Insert Band Insert Detail Report Zoom	ReportHeader	
		Properties	Detail GroupFooter ReportFooter PageFooter	

Figure 49: Inserting a GroupHeader Band

Using a similar approach, insert the GroupFooter band.

Drop a *Page Info* control into the *GroupFooter* band. In the Report Editor's ribbon, use the horizontal centering button to position the control in the top-center of the band. Establish the control's font size (e.g., 10) and text alignment (center).

Times New Roman + A +				QQ	Ð
10 → ΒΙ 및 Ξ Ξ Ξ	<u>n</u> 4 <u>n</u>	몸 몸: 몸: 몸: 몸;	H H H	Zoom Out Zoom	Zoom In
Font	Alignment	Layo	out	Zoom	
1	3	. 4	Center Horizonta Horizontally cente within a band.	ally r the selected control	s ,

Figure 50: Horizontal Centering

The information rendered by a *Page Info* control is defined by its *Page Information* property. The default value is set for displaying the current of total pages. The *Page Information* property is accessible through the Smart Tag associated with the control. Set this property to the value "Page Number".



E Detail E projectsReportBand1 - "Projects"	
▼	
▼ 🗐 detailBand1	
IdetailReportBandDefault1 - "Projects.Data"	
▼ ≣ GroupFooter1	Page Info Tasks
	Page Information Current of Total" Page Numbe 💌
	Start Page Number None
	Format "Current of Total" Page Numbers
	Running Band Page Number (Roman, Lowercase) Page Number (Roman, Uppercase)
	Running Band Page Number (Roman, Lowercase)
	Running Band Page Number (Roman, Lowercase) Page Number (Roman, Uppercase) Current Date and Time

Figure 51: Setting the format of the Page Info Control

Before proceeding, resize the *GroupHeader* and *GroupFooter* bands to remove unused design surface space.

The *Running Band* property of the *Page Info* control defines the band over which the control is executed. Click on the control's Smart Tag and set the *Running Band* property to the value "GroupHeader1".

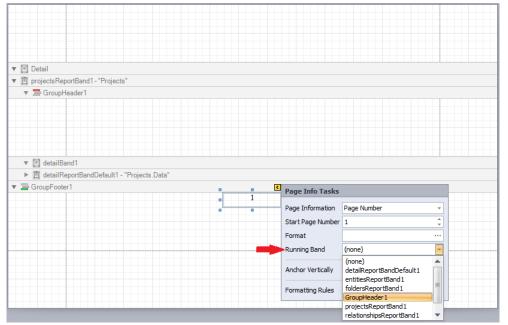


Figure 52: Establishing the Running Band for the Page Info Control



Save and preview the report. Observe that only the final page of the report displays a page number and that it is in the vicinity of the center of that page. To show page numbers on all pages, enable the *Repeat Every Page* property of the *GroupFooter* band, and to position the page number at the bottom of each page, enable the *Print at Bottom* property of the *GroupFooter* band. Quick access to these properties is available via the band's Smart Tag.

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▶ 🚍 GroupHeader1		
▼ 🗐 detailBand1		
	Default1 - "Projects.Data"	
detailReportBandI GroupFooter1 Gro	up Footer Tasks	
Edit	t and Reorder Bands	1
Grou	up Union None 👻	
Form	matting Rules (Collection)	
Page	e Break None 👻	
•	Keep Together	
	Repeat Every Page	
	repeated and a	
	Print at Bottom	

Figure 53: Repeat Every Page and Print at Bottom Properties

Save and preview the report. Now, the page number appears at the bottom of all pages. Another refinement that will move the page number closer to the bottom of the page is to decrease the size of the bottom margin. Drag the bottom margin upward to reduce the vertical space by half.

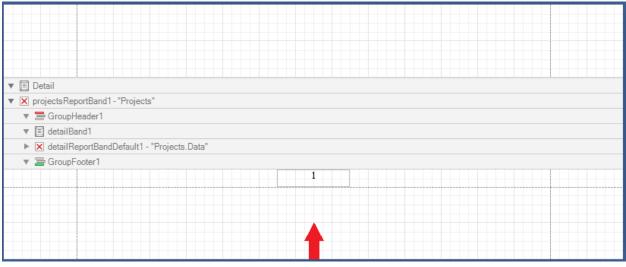


Figure 54: Decreasing the Size of the Bottom Margin



Save and preview the report. The report output is shown below.

 <u>Requirement</u> Accept Requests	<u>Concern</u> Media of		
hier Accept Requests			
R211 Aco Regu	ers ts		
generates 11 Media of Reguest Concern	refined by R.2.1.11 Accept Media of Reguests Requirement		
results in refined by R2111 R21111 Accept Media of Reguests Media of Reguests: Har Requirement	Requirement refined by refined by R21113 Media of Requests: Ver Requirement Requirement	refined by refined by R.2.1.1.4 Register Fel. Register Fel. Registerment Registerment Registerment Registerment	
Project: SAMPLE: Geospatial Library	Organization:	Date: 4/10/2018	
A	ccept Requests Hierarchy Dia	gam	
 	1		

Figure 55: Report Output with Page Numbering - Page 1



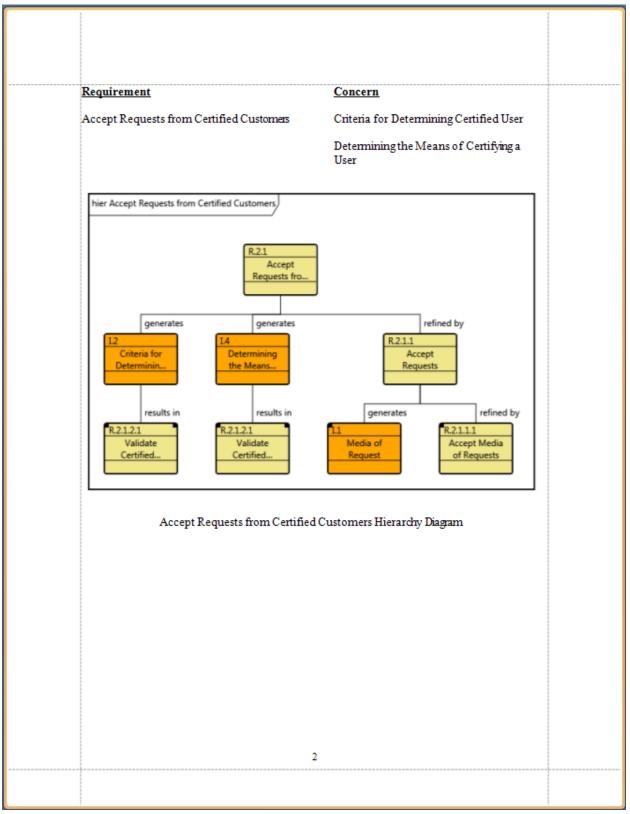


Figure 56: Report Output with Page Numbering - Page 2



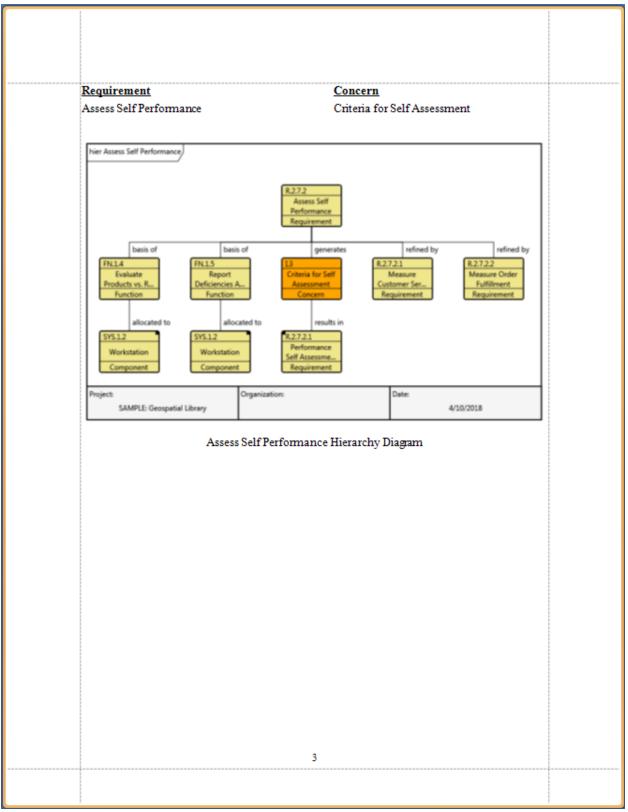


Figure 57: Report Output with Page Numbering - Page 3



Cover Page

To sharpen the focus on the cover page development, it is helpful to simplify the design surface by collapsing the *Projects* band. Click on the arrowhead of the Projects band to collapse it.

- >			 	
🗉 Detail 🕑				
V projecte P	ReportBand1 - "F	Projects"		
projectary				

Figure 58: Collapsing Projects Band on Cover Page

For this report, create a simple cover page containing:

- a title,
- the current date and time, and
- the name of the GENESYS project.

Insert an *Unbound* band within the *Detail* band.

- Right-click in the Detail band,
- Expand the Insert Detail Report sub-menu, and
- Click on the "Unbound" identifier.

• Detail							
 projectsRepo 	lin ×	Edit and Reorder Bands Paste Delete					
	-	Add Sub-Band Insert Band Insert Detail Report	-	Unbound		 	
		Zoom Properties		"Projects"			

Figure 59: Inserting an Unbound Band

The *Unbound* band is added with the default name "detailReportBandDefault2". Rename and reposition the band.

- Right-click on the *detailReportBandDefault2* band.
- Click on the Edit and Reorder Bands ... command to open the Report Editor window.
- In the left side of the *Report Editor* window, select the "*detailReportBandDefault2*" band and click on the up arrow.
- In the right side of the *Report Editor* window, change the band's name to "coverPageBand".
- Close the *Report Editor* window.



Report Editor				
TopMargin	E= A↓		_	
in E Detail	Appearance		×	
🕀 🗐 detailReportBandDefault2	Behavior		×	
+ I projectsReportBand1	Data		~	
🤐 🛄 BottomMargin	Data Member			
	Filter String			
	Tag			
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	 Desian		\$	
	(Name)	coverPageBand		
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			lose	

Figure 60: Repositioning and Renaming a Band

Before adding content, double the vertical space allocated to the *coverPageBand*, and establish a page break to separate the cover page from the rest of the report.

- Click on the coverPageBand Smart Tag.
- Open the Page Break property drop-down box and select the value "After the Band".

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▼ 🗐 detailBand7	Edit and Reorder Bands		
	Luit and Reorder Danus		
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	Filter String		•
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■ projectsReportBan	Formatting Rules	(Collection) ····	•••
	Page Break	None	
		None	
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		Before the Band, Except for the Fi	First Fotry
		After the Band	
		After the Band, Except for the Las	act Entry
		Arter the band, except for the cas	asc unu y

Figure 61: Setting a Band's Page Break Property



Add cover page content.

- Drop a *Label* control into the *coverPageBand* design surface.
- Extend the Label control horizontally to utilize the entire space between the design surface margins.
- Set the Label control's font size to 16 and text alignment to center.
- Set the Label control's Text property to the string "Requirements with Concerns Report".
- Drop a *Label* control into the *coverPageBand* design surface and below the previous *Label* control.
- Extend the *Label* control horizontally to utilize the entire space between the design surface margins.
- Set the *Label* control's font size to 12 and text alignment to center.
- Set the Label control's Text property to the string "created on".
- Drop a *Page Info* control into the *coverPageBand* design surface and below the previous *Label* control.
- Extend the *Page Info* control horizontally to utilize the entire space between the design surface margins.
- Set the *Page Info* control's font size to 12 and text alignment to center.
- Set the *Page Info* control's *Page Information* property to the value "Current Date and Time". (Hint: Use the control's Smart Tag.)
- Drop another Label control into the coverPageBand design surface and below the Page Info control.
- Extend the *Label* control horizontally to utilize the entire space between the design surface margins.
- Set the Label control's font size to 12 and text alignment to center.
- Set the Label control's Text property to the string "for the project".

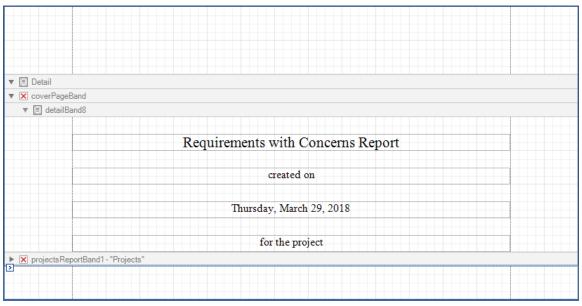


Figure 62: Requirements with Concerns Cover Page

Include the project name to complete the cover page.

- Insert a *Projects* band within the detail section of the *coverPageBand*.
- Rename the band to "coverPageProjectsBand".
- Drop a Label control into the coverPageProjectsBand design surface.
- Extend the Label control horizontally to utilize the entire space between the design surface margins.
- Set the Label control's font size to 12 and text alignment to center.
- Bind the *Label* control to the *Project* object.
- Eliminate the unused space at the bottom of the coverPageProjectsBand.



E Detail
▼ coverPageBand
▼ 🗉 detailBand8
Requirements with Concerns Report
created on
Thursday, March 29, 2018
for the project
▼ 🗷 coverPageProjectsBand - "Projects"
🔻 🔳 detailBand9
[Project]
Image: SeportBand1 - "Projects"

Figure 63: Requirements with Concerns – Completed Cover Page

Save and preview the report. The cover page (shown below) is the first page of the report output.



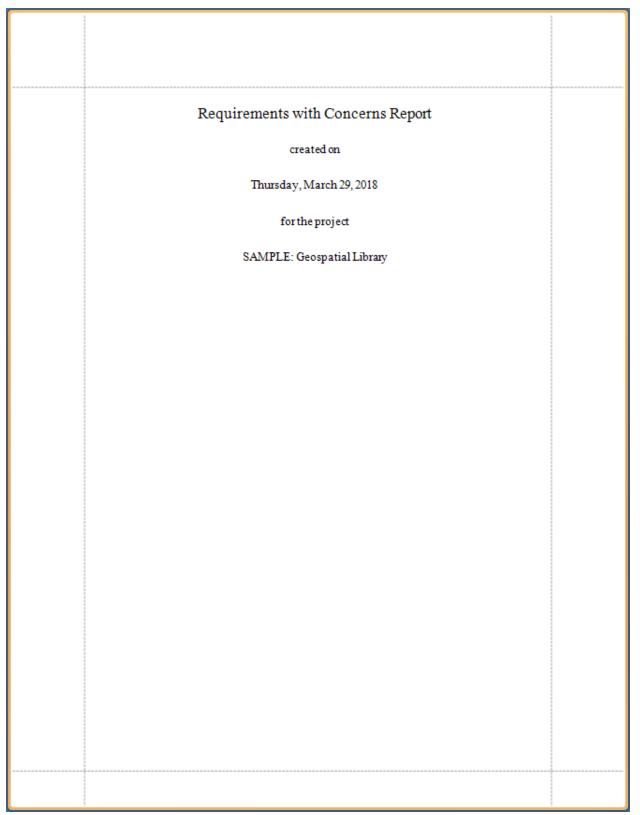


Figure 64: Cover Page Output



ADDITIONAL RESOURCES

- GENESYS Report Writer Course
 Dev Express Xtra Reports documentation: <u>https://devexpress.com/Support/Documentation</u> (Click on the Reporting link.)



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