

Simplify Coding using Enhanced Data Classes

PxPlus 2019 (v16)

Agenda

- Review of Dynamic Data Classes
- Data Class Definition Enhancements
- Data Classes in Library Bulk Edit Utility
- Data Classes in Report Writer
- Extended Class Validation and Display
- Populate from Data Source Functionality

REVIEW OF DYNAMIC DATA CLASSES

Dynamic Data Classes

Review of Dynamic Data Classes

- Introduced Dynamic Data Class properties in PxPlus 2018
 - Expressions and a new `obj/class.pvc` object used to make allowable control properties dynamic

Examples

- `%nomads'class'text$` or `%nomads'class'tip$`





- Values will be read from the settings associated with the Data Class at run time
- Changes made to the Data Class will automatically be applied to controls

DATA CLASS DEFINITION ENHANCEMENTS

Usability

- Browsing
 - **First** and **Last** browse buttons added
- Copy Functionality
 - Enter new Data Class name
 - Press 'OK' button
- Dirty Record Checking
 - Dialog appears when moving off a record where changes have been made

Data Class Definition Enhancements


Class Name:    

Control Type:

Description:

*Dynamic Internal Data Type: Internal Size:

Confirm

 Changes have been made to Data Class 'COUNTRY'. Do you want to save them?

Copy Data Class

Data Class

Copy From:

Copy To:

Definition Changes

Data Class Definition Enhancements

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Data Class Definitions

Class Name: COPY

Control Type: List Box

Description: Fixed Dynamic Tree View List Box

*Dynamic Internal Data Type: String Internal Size: 1

Display

Attributes

Auto Tab Skip Borderless Enable Scrolling Ignore Change Flag

Initially Disabled Strip Trailing Spaces Automatic (Signal All Changes)

Initially Hidden Signal On Exit Disable On Empty

User Aids

Validation

Query

Tree View Attributes

Data Has Bitmaps Show Lines

Direct Edit

Disable Sorting

Suppress Buttons

Other

Alt-Key: Object Persis

*User Tag Field: Fixed

Buttons: Popup Menu, Custom Info, Write, Delete

***Format**

***States**

Properties marked with an asterisk are dynamic

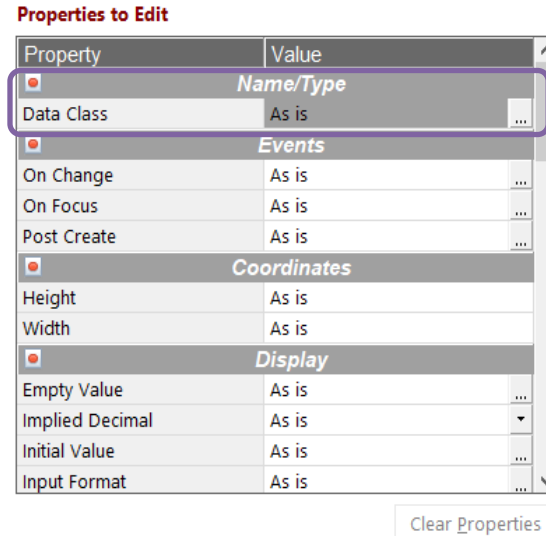
- Multi-Lines
 - Added new **Spell Check Attribute**
 - Query button bitmap image can be an expression
- Report View List Boxes
 - Added new **Lock Top Rows Attribute**
- Tree View List Boxes
 - State Image/Indicators are now dynamic

LIBRARY BULK EDIT UTILITY

Library Bulk Edit and Data Classes

Library Bulk Edit

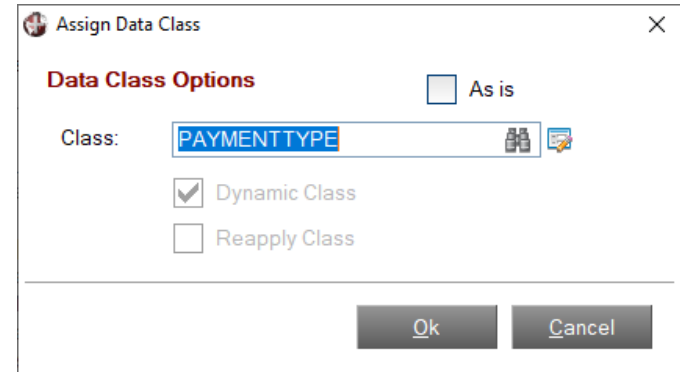
- Added support for Data Classes in PxPlus 2018 Update 1
 - Simplify switching to Dynamic Data Classes
- Data Class to appear in properties grid, if Control Type is set to:
 - Multi-Line
 - Check Box
 - Drop Box
 - List Box
 - Tristate Check Box
 - Variable Drop Box
 - Variable List Box



Applying Data Class

Library Bulk Edit

- Assign Data Class dialog
 - Choose an existing data class to be assigned to the selected controls
 - Create a new Data Class and then assign it to the selected controls
 - Clear the current Data Class assigned to the selected controls
 - Re-apply the current data class assigned to the selected controls



Apply Sequence

Library Bulk Edit

- Many properties may be impacted by a Data Class Change
 - When the Apply button is pressed on the Library Bulk Edit panel, the class is applied first
 - If any other properties were also specifically set in the properties grid, these changes will be applied afterward (over-writing the Data Class settings)

REPORT WRITER

A purple speech bubble with a white border and a drop shadow, pointing to the left towards the 'REPORT WRITER' text.

Remember

The Report Writer is
now included in all
PxPlus bundles

Report Writer Parameters

Report Writer

Parameter Name	Class	Prompt / Description	Type	Maximum Length	Minimum Value	Maximum Value	Default Value	Format
start_date		Starting Date	Text	8			*from class*	*from class*
end_date		Ending Date	Text	8			*from class*	*from class*
rep		*from class*	Text	3			*from class*	*from class*
			Text					

Data Class Information

Class Name - Description (Control Type)	SALESREP - Sales Rep Id (Input Field)
Query	SALESRE2_QRY,scmlib.en

- Data Class can now be specified for Default Parameter Interface
- Simplifies definition of Report Parameters when they correspond to defined Data Classes
- Added **Class** column and **Data Class Information** grid
- Hidden, if no Data Classes have been defined

Assigning a Class

Report Writer

Parameter Name	Class	Prompt / Description	Type	Maximum Length	Minimum Value	Maximum Value	Default Value	Format
start_date		Starting Date	Text	10			01/01/2019	00/00/0000
end_date		*from class*	Text	8			*from class*	*from class*
rep		*from class*	Text	3			*from class*	*from class*
			Text					

- **Prompt/Description**, **Default Value** and **Format** will come from the Class definition
 - Message Box gives the option to over-write, if values had already been entered
 - Data Class values may be over-ridden simply by entering other values

Removing a Class

Report Writer

- Button beside the Data Class Information grid can be used to remove the class specification from the parameter

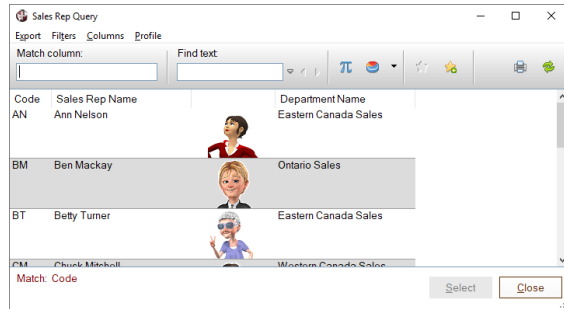
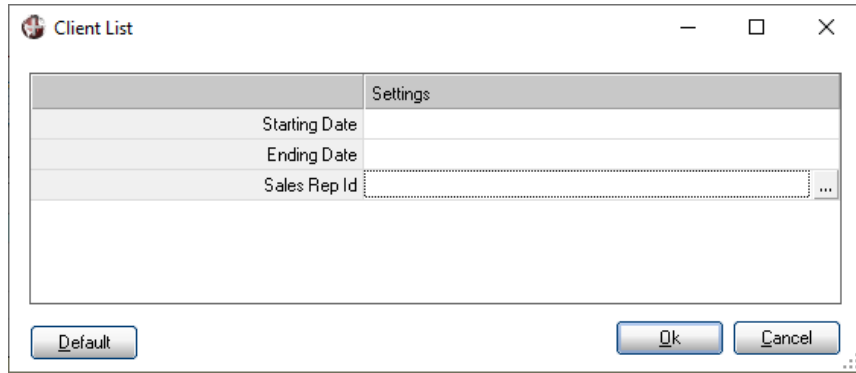
Data Class Information

Class Name - Description (Control Type)	SALESREP - Sales Rep Id (Input Field)
Query	Salesrep_qry.scrnlib.en



Running the Report

Report Writer



- At run time, the Default Parameter Interface panel appears
 - Titles come from Description of Data Class
 - List Box Data Classes are displayed as Drop Boxes
 - Only records with the appropriate Sales Rep will be included in the report
(assuming filter is set to parameter 3 value)

EXTENDED CLASS VALIDATION AND DISPLAY

What is Extended Class Validation?

Extended Class Validation and Display

- Original concept from Class Extension Maintenance in the Framework
- Available for Dynamic, multi-line Data Classes
- Two components:
 - Validation
 - Allows input to be validated against existing records in a specified data file defined in the Data Dictionary
 - Display
 - Allows optional related value(s) to be populated for display purposes
 - Can be used in place of EZ Load or SmartLoad when defining a multi-line control

Extended Class Validation Example

Extended Class Validation and Display

CATS Sales Rep File Maintenance

Sales Rep Code: AN

Name: Ann Nelson

Department: EAST Eastern Canada Sales

Year-to-date Sales: 73,065.59

Write Delete Clear Exit

- Department Entry in Sales Rep File Maintenance
- Validate Department Entry
- Display Department Name

Extended Class Validation Controls

Extended Class Validation and Display

- Different NOMADS controls for the two components:
- Validation Control
 - Original multi-line NOMADS control which has the dynamic Data Class assigned
- Display Control(s)
 - Other multi-line NOMADS controls created to display related value(s) that are populated during the validation of the original control

Extended Class Validation Steps

Extended Class Validation and Display

- Three Steps:
 1. Define Extended Validation in Data Class Definition
 2. Create NOMADS Validation Control
 3. Create optional NOMADS Display Control(s)

1. Data Class Definition

Extended Class Validation and Display

- Validation Tab in Data Class Definition

New section added when defining a Multi-Line data class

The screenshot shows the 'Data Class Definitions' window in PVX Plus. The 'Class Name' is 'SALESREP', 'Control Type' is 'Multi Line', and 'Description' is 'Sales Rep Id'. The 'Dynamic' checkbox is checked, and 'Internal Data Type' is 'String' with an 'Internal Size' of 3. The 'Validation' tab is selected, showing the 'Extended Validation' section. This section includes a checked 'Use Extended Validation' checkbox, a 'Table' field set to 'Sales Rep', a 'Key' field set to 'SalesrepKey: Sales Rep Code', a 'Descriptive Field' dropdown set to 'Name\$', a checked 'Populate All Fields' checkbox, an 'Error if Invalid' field set to 'FW_INVALID', and an empty 'Logic if not found' field. The window also has a 'Display' tab, 'Attributes' section, and 'User Aids' section. At the bottom, there are buttons for 'Popup Menu', 'Write', 'Delete', 'Clear', and 'Exit'.

Use Extended Validation

Extended Class Validation and Display

- Use Extended Validation checkbox
- Disabled, if no Data Class or non-dynamic class
- Initially unchecked
- Disable Validator and Formatter inputs above
- Enable Extended Validation controls

Data Validation / Display Logic

Validator:

Formatter:

Rules:

Extended Validation

Use Extended Validation

Table:

Key:

Descriptive Field: Populate All Fields

Error if Invalid:

Logic if not found:

Extended Validation Inputs

Extended Class Validation and Display

Table:

Sales Rep



A. Table

- Type name from Data Dictionary, select from query, or Select Table button

Key:

SalesrepKey: Sales Rep Code



B. Key

- Defaults to the primary key when Table is entered
- Used to validate the entry

Extended Validation Inputs

Extended Class Validation and Display

Descriptive Field: Populate All Fields

C. Descriptive Field (Display)

- Optional
- Select from a list of string elements in Lookup Table
- Populate a variable called **SHOW.XXXX\$** where XXXX\$ is the original NOMADS multi-line validation control which has the data class

D. Populate All Fields

- Check, if you wish ALL elements in the validation table to be populated in the format **SHOW.XXXX.element\$** where element\$ is the name of the column in the Lookup Table

Extended Validation Inputs

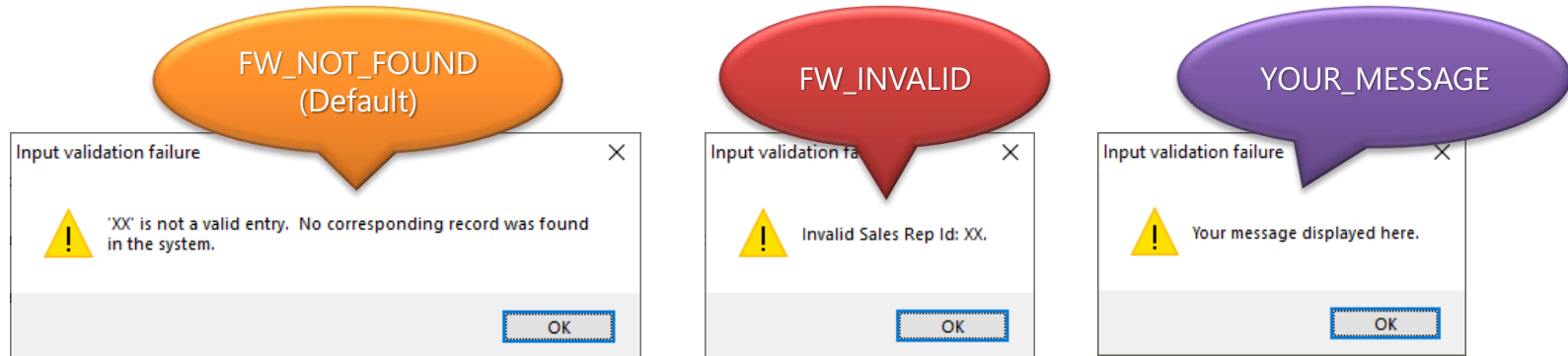
Extended Class Validation and Display

Error if Invalid:

FW_INVALID

E. Error, if Invalid

- Error message from Message Library to display if validation fails
- Will use **FW_NOT_FOUND** if no other message code is entered



Extended Validation Inputs

Extended Class Validation and Display

Logic if not found:

F. Logic, if not found

- Will supersede Input Validation failure message, if entered
- Code entered will be executed using the **EXECUTE** directive

2. NOMADS Designer – Class Control

Extended Class Validation and Display

- Create multi-line control and assign class using Extended Validation
- Validation Tab - Key Field (*skips file validation*)
 - Visible only when defining a multi-line control that has been assigned a dynamic data class

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Multi Line Properties

Name: REP

Class: SALESREP

Dynamic Class

Display Dynamic (from Data Class)

Font/Color

Attributes

Logic

Data Validation / Display Logic Key Field (skips file validation)

Validator: =%nomads'class'extClassVal\$(id\$,"SALESREP"_x\$_show.\$_show.rec\$_show.ioI\$

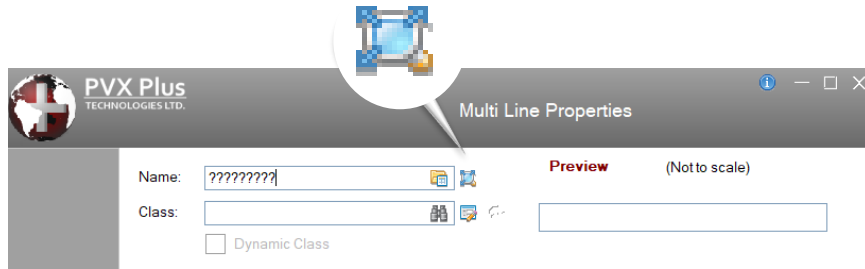
Formatter: =%nomads'class'extClassFormat\$(id\$,"SALESREP"_x\$_show.\$_show.rec\$_show

Rules: Dynamic %nomads'class'rules\$

Check if multi-line
being defined
should accept non-
existing data

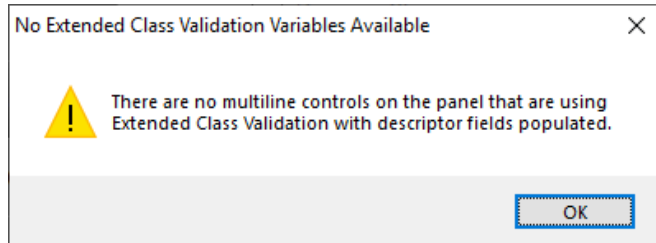
3. NOMADS Designer 'display' multi-lines

Extended Class Validation and Display



- New **Browse Extended Class Variables** button

- Enabled for multi-line controls with no Data Class assigned (if Data Class file exists)

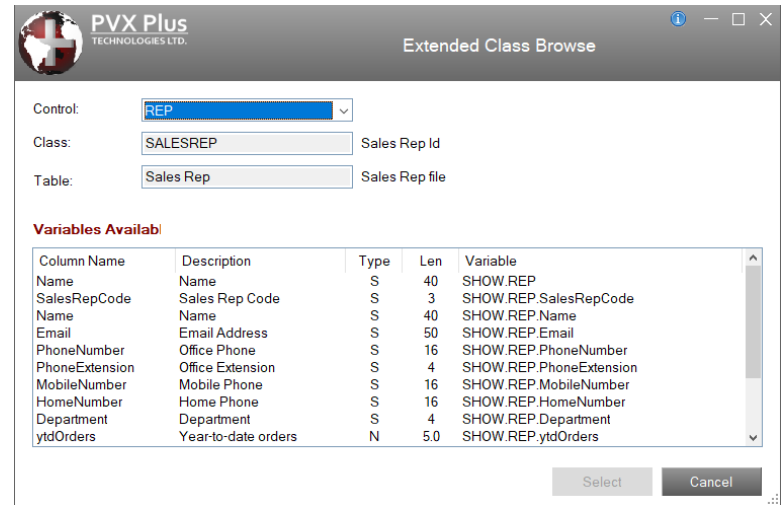


- Message displays if no multiline controls on panel currently use Extended Class Validation with descriptor fields populated

Extended Class Browse

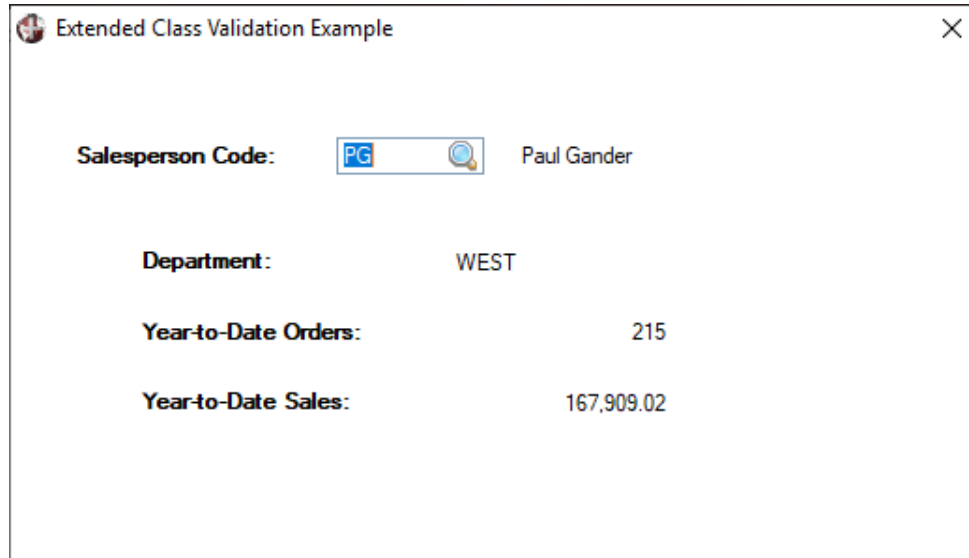
Extended Class Validation and Display

- Dialog displays showing all Extended Class Validation Display variables that are available on the panel
- Switch between controls using **Control** drop box
- Controls created are made **Locked**, **Borderless** and **Transparent**



Extended Validation Demo

Extended Class Validation and Display



The screenshot shows a window titled "Extended Class Validation Example" with a close button (X) in the top right corner. The window contains a form with the following fields and values:

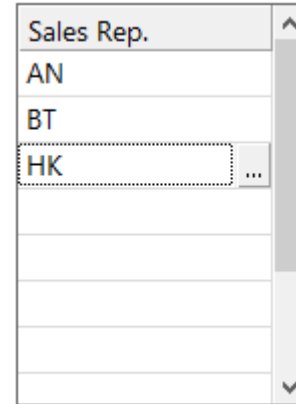
Salesperson Code:	<input type="text" value="PG"/>	Paul Gander
Department:	WEST	
Year-to-Date Orders:	215	
Year-to-Date Sales:	167,909.02	

Extended Validation in a Grid

Extended Class Validation and Display

- As of PxPlus 2019 Update 1, when assigning **Class** as a Grid Preset Property:
 - Added Extended Validation functionality
 - Display functionality is not supported

Property	Column (Number/Name)	Row	Exp	Value/Expression
RowsHigh	0	0	<input type="checkbox"/>	10
ColumnWidth	-1	0	<input type="checkbox"/>	0
AutoColSize	0	0	<input type="checkbox"/>	1
Class	1	0	<input type="checkbox"/>	SALESREP



POPULATE FROM DATA SOURCE FUNCTIONALITY

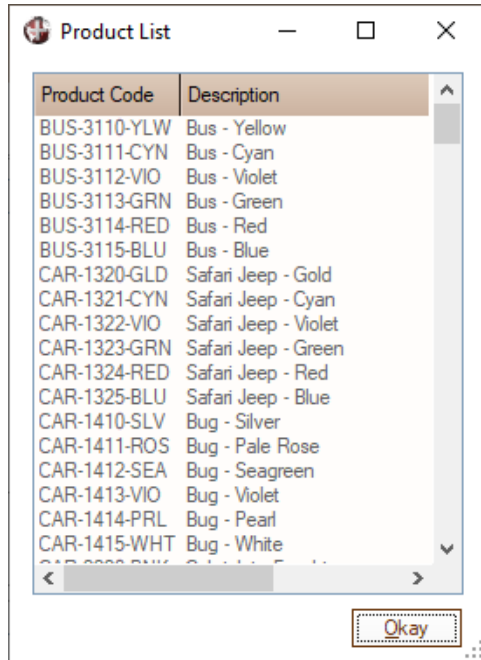
What is Populate from Data Source?

Populate from Data Source Functionality

- Allows drop boxes and list-boxes to be populated from existing records in a specified data file defined in the Data Dictionary
- Available for Dynamic, drop-box or list-box Data Classes
- Similar to Extended Validation
- Can be used in place of SmartLoad (no query needed) if the control doesn't need multiple columns

Populate from Data Source Example

Populate from Data Source Functionality



- Product List concurrent `lookup` in Product File Maintenance
- Populates list box by listing all entries in the **Product** data file

Data Class Definition

Populate from Data Source Functionality

- Display Tab in Data Class Definition
- checkbox
- Standard List Value inputs are hidden and replaced with Load from File inputs when checkbox is checked

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Data Class Definitions

Class Name: DB_SALESREP

Control Type: Drop Box

Description: Fixed Sales Rep ID in Dropdown

*Dynamic: Internal Data Type: String Internal Size: 1

Display

Drop Box Width: 30.00 Drop Box Height: 5.00

***List Values**

Load From File

Table: Sales Rep

Key: SalesrepKey: Sales Rep Code

Drop Box Display Value: Name\$ Include Key and Value in Drop Box

Return Value: SalesrepKey

***Visual Class** Expression

***Nomads Class** Expression

Popup Menu Write Delete Clear Exit

Load from File Inputs

Populate from Data Source Functionality

Table:

Sales Rep



A. Table

- Type name from Data Dictionary, select from query, or Select Table button

Key:

SalesrepKey: Sales Rep Code



B. Key

- Defaults to the primary key when Table is entered
- Determines the sort sequence for the control contents
- If no Drop/List Box Value is entered, these key values are the control contents

Load from File Inputs

Populate from Data Source Functionality

Drop Box Display Value: Include Key and Value in Drop Box

C. Drop/List Box Display Value (optional)

- Select from a list of string elements in the Table to use as the control contents

D. Include both Key and Value in Drop/List Box

- Disabled unless a Drop/List Box Display Value was entered
- When checked, both values are used for the control contents
- Format is **key value: drop/list box value** for drop boxes and standard list boxes
- For other list box types, multiple columns may be used

Load from File Inputs

Populate from Data Source Functionality

Return Value:

SalesrepKey



E. Return Value

- Defaults to primary key when Table entered
- Valid options consist of all keys and a Drop/List Box Display Value if one was entered

Load from File Drop Box Results

Populate from Data Source Functionality

No Drop Box Value

Load from Drop Box Example

Salesperson Code:

BM	▼
AN	▲
BM	
BT	
CM	
DK	
GT	
HK	
OB	
PG	▼

Drop Box Value entered

Load from Drop Box Example

Salesperson Code:

Ben Mackay	▼
Ann Nelson	▲
Ben Mackay	
Betty Turner	
Chuck Mitchell	
Donna Kerr	
Gordon Taylor	
Hank Kane	
Olivia Black	
Paul Gander	▼

Both Key Value and Drop Box Value entered

Load from Drop Box Example

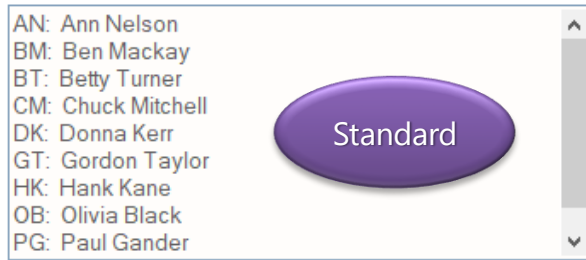
Salesperson Code:

BM: Ben Mackay	▼
AN: Ann Nelson	▲
BM: Ben Mackay	
BT: Betty Turner	
CM: Chuck Mitchell	
DK: Donna Kerr	
GT: Gordon Taylor	
HK: Hank Kane	
OB: Olivia Black	
PG: Paul Gander	▼

Load from File List Box Results

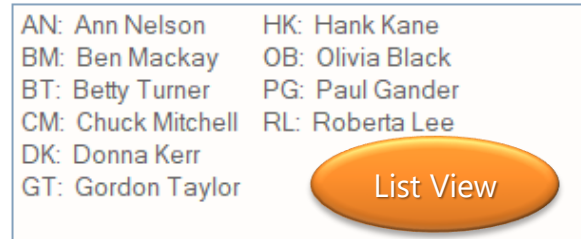
Populate from Data Source Functionality

(all with **Include Key and Value in List Box** checked)



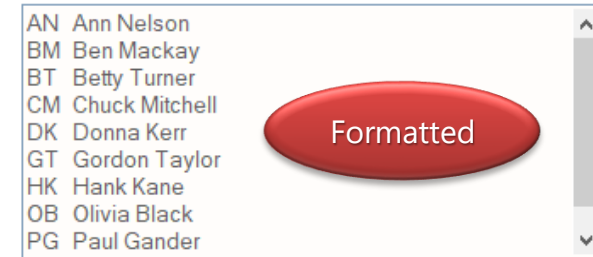
Standard

AN: Ann Nelson
BM: Ben Mackay
BT: Betty Turner
CM: Chuck Mitchell
DK: Donna Kerr
GT: Gordon Taylor
HK: Hank Kane
OB: Olivia Black
PG: Paul Gander



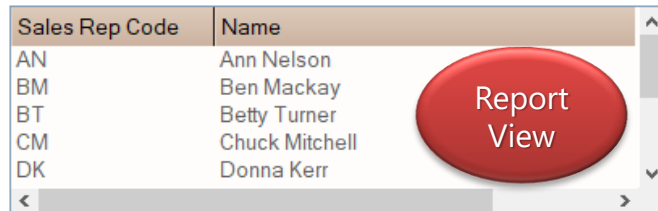
List View

AN: Ann Nelson	HK: Hank Kane
BM: Ben Mackay	OB: Olivia Black
BT: Betty Turner	PG: Paul Gander
CM: Chuck Mitchell	RL: Roberta Lee
DK: Donna Kerr	
GT: Gordon Taylor	



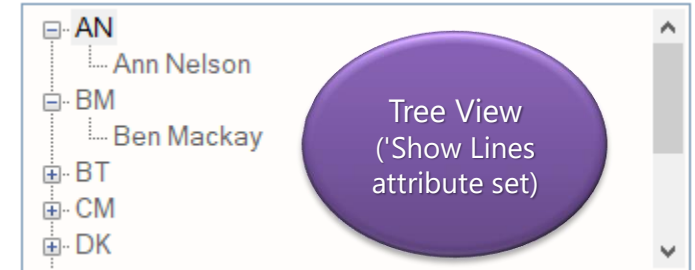
Formatted

AN	Ann Nelson
BM	Ben Mackay
BT	Betty Turner
CM	Chuck Mitchell
DK	Donna Kerr
GT	Gordon Taylor
HK	Hank Kane
OB	Olivia Black
PG	Paul Gander



Report View

Sales Rep Code	Name
AN	Ann Nelson
BM	Ben Mackay
BT	Betty Turner
CM	Chuck Mitchell
DK	Donna Kerr



Tree View
(‘Show Lines attribute set)

- AN
 - Ann Nelson
- BM
 - Ben Mackay
- BT
- CM
- DK

Populate from Data Source in a Grid

Populate from Data Source Functionality

- As of PxPlus 2019 Update 1, when assigning **Class** as a Grid Preset Property:
 - Populate from Data Source functionality works for both Drop Boxes and List Boxes
 - List Boxes are converted to Drop Boxes (some formatting might be lost)

Drop Box	List Box
GT: Gordon Taylor	RL: Roberta Lee
PG: Paul Gander	BM: Ben Mackay
	AN: Ann Nelson
	BM: Ben Mackay
	BT: Betty Turner
	CM: Chuck Mitchell
	DK: Donna Kerr
	GT: Gordon Taylor
	HK: Hank Kane
	OB: Olivia Black
	PG: Paul Gander
	RL: Roberta Lee

Recap

Simplify Coding using Enhanced Data Classes

- Data Class functionality improvements started in PxPlus 2018 have continued into PxPlus 2019
- Integrating Data Classes throughout PxPlus toolset
 - Library Bulk Edit Utility
 - Report Writer
 - NOMADS Screen Designer
 - New File Maintenance Wizard
- **Dynamic Data Classes** allow for new Extended Validation for multi-lines and Populate from Data Source functionality for drop boxes and list boxes

More details at the
[File Maintenance Wizard PDF](#)

Additional Resources

The help link(s) below refer to the current on-line help pages. The functionality may have been further updated since the PxPlus 2019 (version 16) release.

- [Data Classes](#)
- [Dynamic Control Properties](#)
- [Extended Class Validation and Display](#)
- [Populate from Data Source](#)
- [Data Classes - Frequently Asked Questions](#)
- [Library Bulk Edit and Search Utility](#)
- [Report Writer Parameters](#)