

# Office Integration Demystified

## PxPlus Excel & Word Objects

PxPlus 2017 (v14) & PxPlus 2018 (v15)

# Prior to PxPlus 2017

- Access to Excel or Word
  - Originally - [DDE] tag (Dynamic Data Exchange)

```
OPEN (1) " [WDX] [DDE] excel;existing_sheet.wk1 "
```

- More recently - COM Object

```
DEF OBJECT EXCEL "Excel.Application"  
                or  
DEF OBJECT WORD "Word.Application"
```

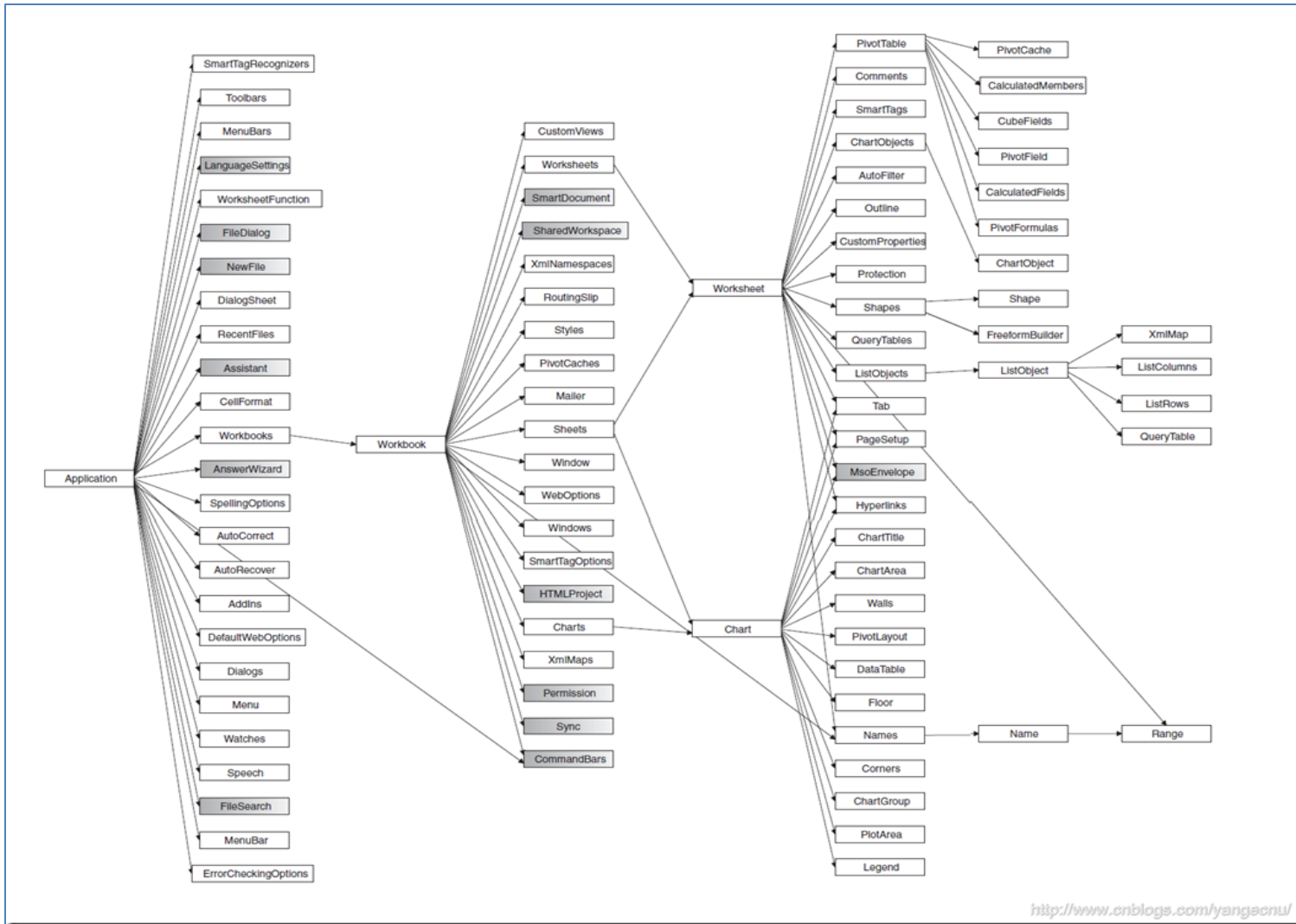
What next?



# What next?

- Internet search
- Microsoft Developer Network (MSDN)
  - Excel Object Model
  - Word Object Model
- Probably **too much** information for most purposes

# Excel Object Model



# Solution

- PxPlus Excel Object (\*obj/excel.pvc)
- PxPlus Word Object (\*obj/word.pvc)
- Include the most common functionality for Business Applications from Microsoft's objects
  - Simplify development
  - Hides internal workings
- Still provides access to all Microsoft functionality by exposing handles to the main MS object as well as error and constants objects



2017



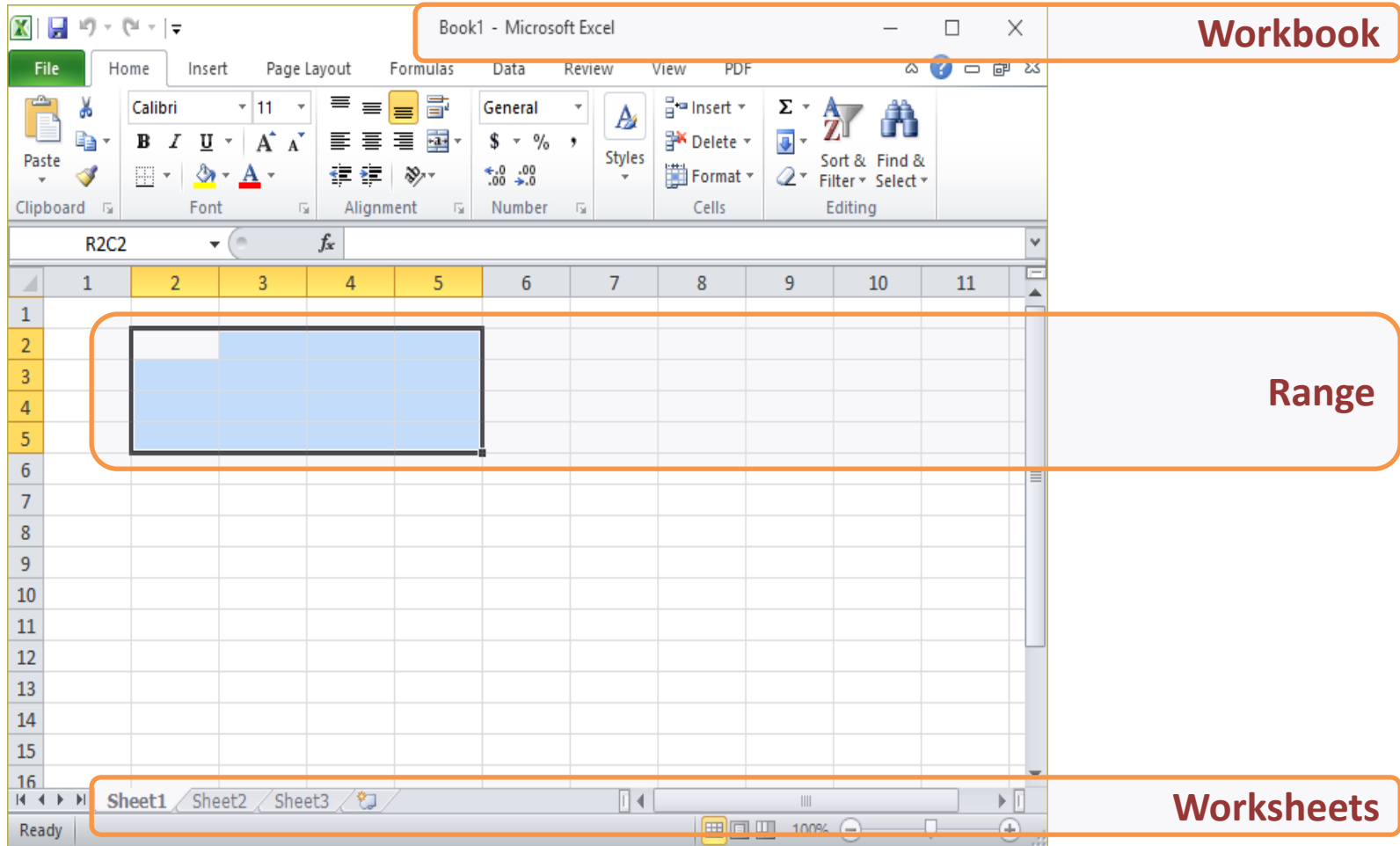
For  
Experienced  
users

# PXPLUS EXCEL OBJECT

# Excel MSDN Terminology

- **Application object**
  - The Excel application itself
- **Workbook**
  - An Excel file containing spreadsheet(s)
- **Worksheet**
  - Individual tab/spreadsheet
- **Range**
  - Selected range (for applying fonts, formatting etc.)

# Excel Screen (default values)





# PxPlus Excel Object

\*obj/excel.pvc

- Instantiation

```
x=new ("*obj/excel")
```

where 'x' is the object identifier and could be any numeric variable

# Application Properties

- **EXCEL** (*Read Only*)
  - Handle to the Excel Application object
- **ECONSTANTS** (*Read Only*)
  - Handle to the Excel Named Constants object
- **ERROR** (*Read Only*)
  - Handle to the Excel Error object
- **VISIBLE**
  - Allows Excel application to be made visible
  - Defaults to Off (0)
- **DISPLAY\_ALERTS**
  - Allows suppression of Excel message boxes (e.g. saving changes on close)
  - Defaults to Off (0)

# Workbook Properties

- **ACTIVE\_WORKBOOK** *(Read Only)*
  - Handle to the active workbook object
  - `x'Active_Workbook = x'EXCEL'ActiveWorkbook`
  
- **WORKBOOKS\_COUNT** *(Read Only)*
  - Number of workbooks open
  - `x'Workbooks_Count = x'EXCEL'WORKBOOKS'Count`

Arguments in  
*blue italics*  
are optional


# Workbook Methods

- CreateWorkbook(path\$, *overwrite\_flag*)
- OpenWorkbook(path\$)
- SetWorkbook(workbook or workbook\_name\$)
- SaveWorkbook(*workbook or workbook\_name\$*)
- SaveAsWorkbook(workbook\_path\$, *workbook or workbook\_name\$*)
- SaveWorkbooks( )
- CloseWorkbook(*workbook or workbook\_name\$*)
- CloseWorkbooks( )

# General Notes

- Workbooks can be referred to by index number (workbook) or by name such as "name.xlsx" (workbook\_name\$)
- In Excel, index numbers correspond to the order workbooks were opened
- Methods that take optional workbook or workbook\_name\$ arguments will use the **ACTIVE\_WORKBOOK** property if no workbook argument is passed
- SaveWorkbooks() and CloseWorkbooks() act on all opened workbooks
- Most methods return '1' for success and '0' for failure

# SaveAsWorkbook() Method

- SaveAsWorkbook(workbook\_path\$, *workbook or workbook\_name\$*)
- Enhanced for PxPlus 2018 
- Allows a workbook or a workbook\_name\$ to be specified (rather than always saving the current workbook)
- Saves the workbook with the file type specified in the workbook\_path\$ variable
  - Defaults to an Excel Workbook file type (.xlsx)
  - Also supports the file types on the following slide

# SaveAsWorkbook – File Extensions

Extension	Description	Extension	Description
.xlsx	Excel Workbook (default)	.csv	CSV (Comma delimited)
.xlsm	Excel Macro-Enabled Workbook	.txt	Text (Tab delimited)
.xlsb	Excel Binary Workbook	.prm	Formatted Text (space delimited)
.xls	Excel 97-2003 Workbook	.dif	DIF Data Interchange Format
.xml	XML Data	.slk	SYLK (symbolic Link)
.mht, .mhtml	Single File Web Page	.xlam	Excel Add-In
.htm, .html	Web Page	.xla	Excel 97-2003 Add In
.xltx	Excel Template	.pdf	PDF
.xltn	Excel Macro-Enabled Template	.ods	OpenDocument Spreadsheet
.xlt	Excel 97-2003 Template	.xps	XPS Document

# Worksheet Property and Methods

- **ACTIVE\_SHEET** (*Read Only*)
  - Active worksheet object on the active workbook
  - `x'Active_Sheet = x'EXCEL'ActiveSheet`
- CreateWorksheet(worksheet\_name\$, *tab\_index*)
  - Created before **ACTIVE\_SHEET** unless a tab index is specified
- SetWorksheet(worksheet or worksheet\_name\$)
- PrintWorksheet(*worksheet or worksheet\_name\$*)



2018



# Arguments for Range Methods

Argument	Description	Example
cells\$	Range	A12 (single) or A2:D5 (range) Range_Name
col	Column Number	1 – 16384
col\$	Column Letter	"B" or "AC"
row	Row Number	1 – 1048576


# Range Property and Methods

- **ACTIVE\_RANGE** (*Read Only*)
  - Active range object for the active worksheet
  - `x'Active_Range = x'EXCEL'Selection`
- `SetRange(cells$, worksheet or worksheet_name$)`
- `SetRangeColumn(col or col$, worksheet or worksheet_name$)`
- `SetRangeRow(row, worksheet or worksheet_name$)`

Note:

Setting ranges by row or column can be slow

# Named Ranges

- New for PxPlus 2018 
- 'Named' Ranges can be defined and used anywhere a range value (such as "A1:G20") would be specified.
- AddNamedRange(name\$,cells\$, *worksheet or worksheet\_name\$*)
- DeleteNamedRange(name\$, *worksheet or worksheet\_name\$*)
  - where name\$ cannot contain spaces

# Set Column Widths Method

- New for PxPlus 2018



2018

- Allows width of columns in a range to be set (in pixels)
- `SetColumnWidth(width, cells$, worksheet or worksheet_name$)`

# FindReplace Method and related Properties

- FindReplaceAll(find\$, replace\$, *worksheet or worksheet\_name\$ or "All"*)
- **CASE\_SENSITIVE\_SEARCH**
  - Defaults to '0' for case insensitive searches
  - Set to '1' for case sensitive searches
- **MATCH\_ENTIRE\_CELL**
  - Defaults to '0' for partial matches within cell contents
  - Set to '1' to force matches on the entire cell contents

# Cell Value Methods and related Property

- **SEPS**



- New Property for PxPlus 2018
  - Defaults to standard PxPlus field delimiter **SEP** (\$8A\$)
- 
- Read\$(*cells\$, worksheet or worksheet\_name\$*)
    - Returns a string for one cell or a **SEPS** delimited string for multiple cells
  - Write(*cell\_values\$, cells\$, worksheet or worksheet\_name\$*)
    - cell\_values\$ is a string or a **SEPS** delimited string
    - Returns '0', '1' or '-1' (discrepancy in cell counts)

# Cell Formatting Methods

- SetColor(color\_index or color\$, *cells\$, worksheet or worksheet\_name\$*)
- SetFillColor(color\_index or color\$, *cells\$, worksheet or worksheet\_name\$*)
  - Excel color\_index is an integer value from 1 to 56
  - color\$ is one of 16 basic PxPlus named colors such as "red" or "light cyan"
  - RGB colors not yet supported
- SetFont(font\$, *cells\$, worksheet or worksheet\_name\$*)
  - font\$ is comma separated "name\$,size\$,style\$"
  - e.g. "Arial" or "Arial,12,Bold"

# Column and Row Methods

- Columns
  - InsertColumn(col or col\$, *worksheet or worksheet\_name\$*)
  - DeleteColumn(col or col\$, *worksheet or worksheet\_name\$*)
- Rows
  - InsertRow(row, *worksheet or worksheet\_name\$*)
  - DeleteRow(row, *worksheet or worksheet\_name\$*)



# Excel Named Constants

- Excel Object Model incorporates hundreds of global named constants
- If required, these Excel constants may be accessed via the **ECONSTANTS** property
- Example
  - constants used for **MATCH\_ENTIRE\_CELL** property

```
x' ECONSTANTS' xlPart (2)
```

```
x' ECONSTANTS' xlWhole (1)
```

# Excel Error Object

- Excel contains an **ERROR** object which may help when debugging code
- Checking the **ERROR'Description\$** property may give more information if a method fails

```
return_value=x'OpenWorkbook("badfile")  
  
if not (return_value) msgbox x'Error'Description$
```

# Excel Demo Program

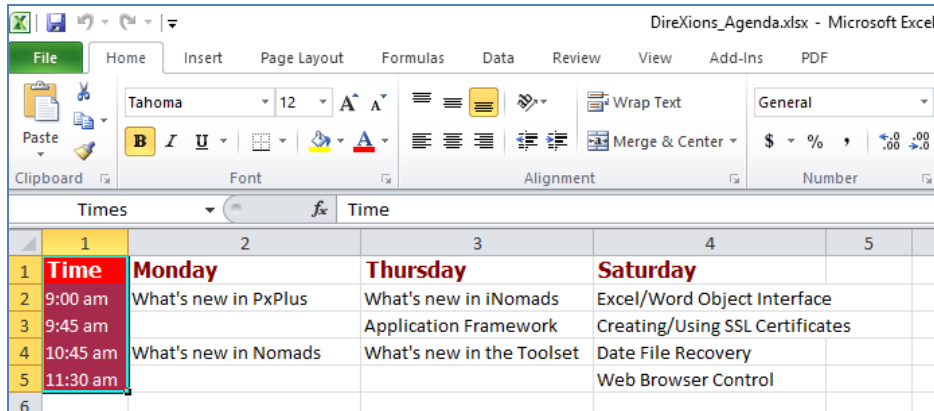
1. Instantiate Excel object
2. Make Excel visible to check progress
3. Create a workbook
4. Check some properties
5. Create a worksheet
6. Write some data
7. Insert a new column (A)
8. Create some named ranges
9. Change separator and populate named column

# Excel Demo Program

continued ...

10. Copy data from one worksheet to another
11. Format (color and font) header row and first column
12. Show use of ERROR object
13. Find and Replace
14. Save
15. Save in different formats
16. Close Workbook
17. Drop object

# Excel Demo Program Results

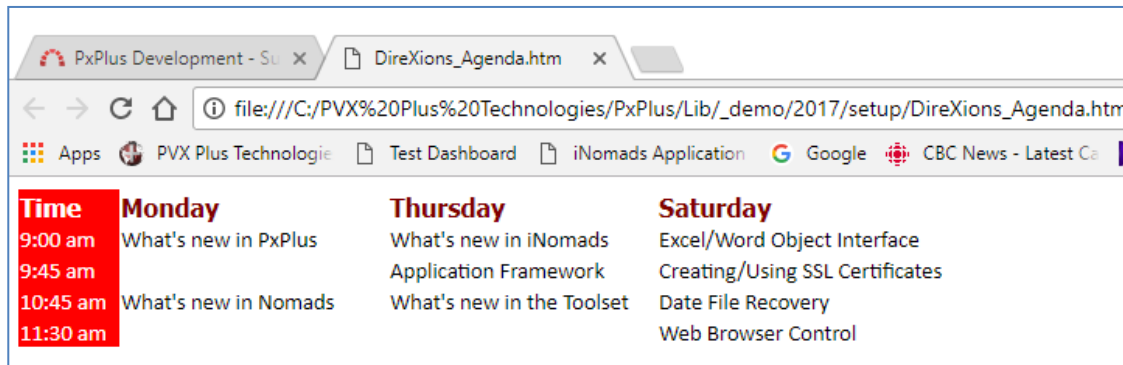


DireXions\_Agenda.xlsx - Microsoft Excel

Times	1	2	3	4	5
1	<b>Time</b>	<b>Monday</b>	<b>Thursday</b>	<b>Saturday</b>	
2	9:00 am	What's new in PxPlus	What's new in iNomads	Excel/Word Object Interface	
3	9:45 am		Application Framework	Creating/Using SSL Certificates	
4	10:45 am	What's new in Nomads	What's new in the Toolset	Date File Recovery	
5	11:30 am			Web Browser Control	
6					

Spreadsheet (.xlsx)

Web Page (.htm)

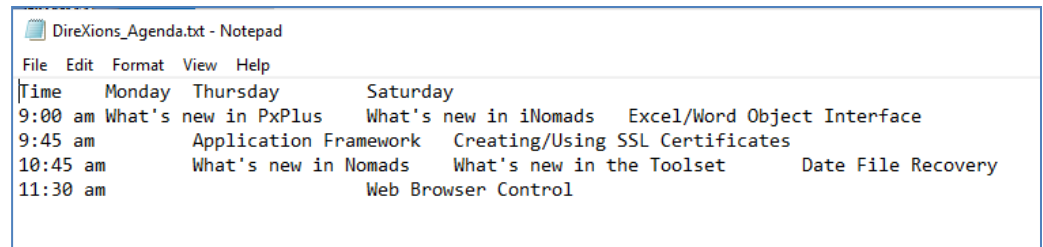


PxPlus Development - Su x DireXions\_Agenda.htm x

file:///C:/PVX%20Plus%20Technologies/PxPlus/Lib/\_demo/2017/setup/DireXions\_Agenda.htm

Time	Monday	Thursday	Saturday
9:00 am	What's new in PxPlus	What's new in iNomads	Excel/Word Object Interface
9:45 am		Application Framework	Creating/Using SSL Certificates
10:45 am	What's new in Nomads	What's new in the Toolset	Date File Recovery
11:30 am			Web Browser Control

Text file (.txt)



DireXions\_Agenda.txt - Notepad

```
File Edit Format View Help
Time Monday Thursday Saturday
9:00 am What's new in PxPlus What's new in iNomads Excel/Word Object Interface
9:45 am Application Framework Creating/Using SSL Certificates
10:45 am What's new in Nomads What's new in the Toolset Date File Recovery
11:30 am Web Browser Control
```

# Questions so far?



# PXPLUS WORD OBJECT

# PxPlus Word Object

\*obj/word.pvc

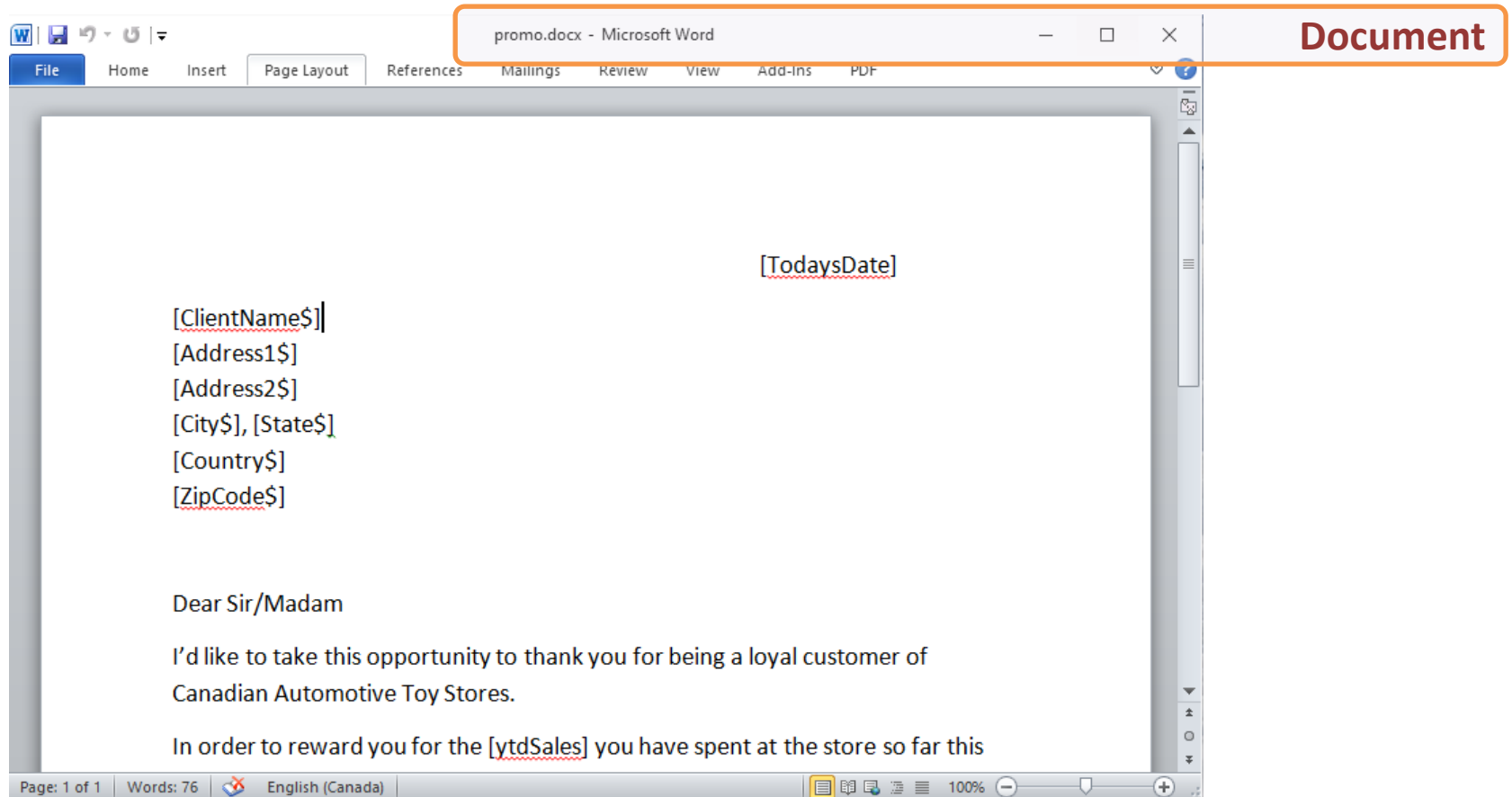
- Only the concept of 'Documents'
- Instantiation

```
w=new ("*obj/word")
```

where 'w' is the object identifier and could be any numeric variable



# Word Screen



# Application Properties

- **WORD** (*Read Only*)
  - Handle to the Word Application object
- **WCONSTANTS** (*Read Only*)
  - Handle to the Word Named Constants object
- **ERROR** (*Read Only*)
  - Handle to the Word Error object
- **VISIBLE**
  - Allows Word application to be made visible
  - Defaults to Off (0)
- **DISPLAY\_ALERTS**
  - Allows suppression of Word message boxes (e.g. saving changes on close)
  - Defaults to Off (0)

# Document Properties

- **ACTIVE\_DOCUMENT** (*Read Only*)
  - Handle to the active document object
  - `w'Active_Document = w'WORD'ActiveDocument`
- **DOCUMENTS\_COUNT** (*Read Only*)
  - Number of documents open
  - `w'Documents_Count = w'WORD'DOCUMENTS'Count`


# Document Methods

Arguments in  
*blue italics*  
are optional

- CreateDocument(path\$)
    - No overwrite\_flag argument – always replaces
  - OpenDocument(path\$)
  - SetDocument(document or document\_name\$)
  - SaveDocument(*document or document\_name\$*)
  - SaveDocuments( )
  - SaveAsDocument(document\_path\$, *document or document\_name\$*)
  - PrintDocument(*document or document\_name\$*)
  - CloseDocument(*document or document\_name\$*)
  - CloseDocuments( )
- 'document' 1 is always the **last** document opened. All other documents move up one index higher

Note:

# SaveAsDocument() Method

- SaveAsDocument(document\_path\$, *document or document\_name\$*)
- Enhanced for PxPlus 2018 
- Allows a document or a document\_name\$ to be specified (rather than always saving the current document)
- Saves the document with the file type specified in the document\_path\$ variable
  - Defaults to a Word Document file type (.docx)
  - Also supports the file types on the following slide

# SaveAsDocument – File Extensions

Extension	Description	Extension	Description
.docx	Word Document (default)	.xps	XPS Document
.docm	Word Macro-Enabled Document	.mht, .mhtml	Single File Web Page
.doc	Word 97-2003 Document	.htm, .html	Web Page
.dotx	Word Template	.rtf	Rich Text Format
.dotm	Word Macro-Enabled Template	.txt	Plain Text
.dot	Word 97-2003 Template	.xml	Word XML Document
.pdf	PDF	.odt	OpenDocument Text

# Find Methods

- Find(find\$, *document or document\_name\$, instance*)
  - To specify *instance* argument for the active document – must pass 0 for *document* or null for *document\_name\$*
- FindInsert(find\$, insert\$, *document or document\_name\$, instance*)
- FindReplace(find\$, replace\$, *document or document\_name\$, instance*)
- FindReplaceAll(find\$, replace\$, *document or document\_name\$ or "All"*)

# Properties related to FIND methods

- **CASE\_SENSITIVE\_SEARCH**
  - Defaults to '0' for case insensitive searches
  - Set to '1' for case sensitive searches
- **INSERT\_BEFORE**
  - Defaults to '0' to insert text after position located
  - Set to '1' to insert text before position located
- **SEARCH\_FORWARD**
  - Defaults to '1' to search from start to end
  - Set to '0' to search from the end of the document



# Format Methods

- FindSetColor(find\$, color\_index or color\$, *document or document\_name\$, instance*)
  - Word color\_index is an integer value from 1 to 56
  - color\$ is one of 16 basic PxPlus named colors such as "blue" or "dark yellow"
  - RGB colors not yet supported
- FindSetFont(find\$, font\$, *document or document\_name\$, instance*)
  - font\$ is comma separated "name\$,size\$,style\$"
  - e.g. "Tahoma" or "Tahoma,9,Italics"

# Word Constants and Error Objects

- If required, Word Named Constants may be accessed via the **WCONSTANTS** property

```
w' WCONSTANTS' wdColorBrightGreen (65280)
```

```
w' WCONSTANTS' wdAlignPageNumberCenter (1)
```

- Checking the **ERROR'Description\$** property may give more information if a method fails

# Word Demo

[TodaysDate]

[ClientName\$]  
[Address1\$]  
[Address2\$]  
[City\$], [State\$]  
[Country\$]  
[ZipCode\$]

Dear Sir/Madam:

I would like to take this opportunity to thank you for being a loyal customer of Canadian Automotive Toy Stores.

To reward you for the [ytdSales] you have spent at the store so far this year, we are enclosing a 25% off coupon for use anytime during the rest of [YearDate].

Enjoy your toy shopping!

Sincerely,

S. Manager

Sr. Sales Manager, Canadian Automotive Toy Stores

- Replace given placeholders in a template document with variable data from an application data file

# Word Demo Program

1. Open 'client.dat' data file
2. Instantiate Word object
3. Select all clients with YTD sales over \$10,000
  - Open Document promo.docx
  - Locate client related defined placeholders and replace them with client specific data
  - Populate date placeholders
  - Format selected text
  - Save as Word document and PDFs
  - Close the document
4. Drop Word object and close data file

# Word Demo Program Results

- 5 letters created in the output directory with personalized information
- 5 PDF documents created

March 15, 2018

Wise Junk Removal  
2329 Golden Treasure Private  
P.O. Box 38  
Sterling, NU  
Canada  
X00 5M9

Dear Sir/Madam

I'd like to take this opportunity to thank you for being a loyal customer of Canadian Automotive Toy Stores.

In order to reward you for the \$11,809.10 you have spent at the store so far this year, we are enclosing a **25% off coupon** for use anytime during the rest of 2018.

Enjoy your toy shopping!

Sincerely,

S Manager  
Sr. Sales Manager, Canadian Automotive Toy Stores

# Running on WindX

- Probably want to run locally on the workstation
- Instantiation

```
x=new (" [lcl] *obj/excel")  
      or  
w=new (" [lcl] *obj/word")
```

- Path\$ arguments cannot include [lcl] or [wdx] tags

# Review

- For both Excel and Word:
  - Created flexible methods for the most common functionality from Microsoft's objects
  - Simplify and speed development
  - Experienced users can still access all Microsoft functionality via properties exposing handles to the MS objects, errors and constants

# PxPlus 2019 and beyond ...

- Please let us know if there is any particular functionality you would like to see added to the Excel and/or Word objects





# 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 2018 (version 15) release.

- [PxPlus Excel Object](#)
- [PxPlus Word Object](#)