What's New in PxPlus 2019

PxPlus 2019 (v16)

What's New in PxPlus

- Product Bundle Changes
  - Core feature set for Base is expanded
  - E-Commerce replace by Web bundle

- New Graphical Features

- Core Language Improvements

- *i*Nomads changes

REVISED PRODUCT BUNDLING

Revised Product Bundle

What has changed in the Base bundle?

- Base bundle now includes the majority of the Add-on packages

  - Good News:
    Functionally equivalent to Professional bundle without WindX or ODBC

  - Bad News:
    Price increased to reflect all the added functionality

  - Great News:
    Base licenses on CCP (maintenance) entitled to new features
    at no extra charge

Revised Product Bundle

- Reasons for changes to Base bundle
  - Improving product had become challenging without these features
  - Base bundle was originally targeted for text mode applications

No call for text mode applications any more

- Advantages with new bundling
  - Allows us to develop more functionality for the core product
    - Avoids having to code workarounds because functionality is suppressed
  - Makes ordering simpler
    - Less confusion over add-on packages
  - Ability to run *i*Nomads in Demo mode

Revised Product Bundle

What has changed in the Professional bundle?

- All Good News:

    Nothing changed

Revised Product Bundle

What happened to E-Commerce bundle?

- E-Commerce Bundle changes
  - Renamed to "Web" bundle
    - Reflects focus on Internet applications and services

  - Now includes *i*Nomads
    - No longer an Add-on package

*i*Nomads runs in Demo mode on both Base and Professional bundles

GRAPHICAL ENHANCEMENTS

Graphical Enhancements

- New Graphical Features

  - Spell Checker
  - Movable 'Sprite' like buttons
  - Better support for image cropping/rotation on controls
  - Grid improvements
  - Faster way to load lists
  - Drop box selection improvements
  - Mnemonic changes

  - And a NEW charting object

See **Charting 101 and New Chart Object** PDF

Spell Checker

- Access to built-in Windows Spell Checker
  - No special installation requirements
  - Validates spelling on the fly
  - Auto detection of repeated words included
  - User language based
    - Windows setting
  - Right mouse click enables spellcheck lookup

DireXions 2019 is a two-day technical conference for application developers and IT leaders who want to maximize the potential of the PxPlus Development Suite to help their organizations meet their business goals. The conference brings together the experts behind the product and leaders from companies in various industries and countries.

| Peplums |
| Plus |
| Papules |
| Add to dictionary |
| Ignore |

Cannot co-exist with your own right mouse click logic

Spell Checker

- Enabled on either specific input controls or system wide
    - Specific MULTI-LINE control
        - Add an OPT="S" to the control definition
            -or-
        - Use the 'SpellCheck property to enable/disable
            - 1 = Enable, 0 = Disable

    - System wide control
        - Enable/Disable by setting the AutoSpellCheck 'Option'
            'No'   - never automatically enable spell checking
            'Yes'   - enable spell check on inputs > one line (default)
            'All'   - enable on all inputs > 12 characters without format

SETDEV (0) Set "AutoSpellCheck" To "Yes"

Spell Checker

- User dictionary maintained by Windows
- To gain access:
  - Use the Windows key + R keyboard shortcut to open the Run command.
  - Type the following path and click OK.

%APPDATA%\Microsoft\Spelling

  - Select the language directory (e.g. en-US)
  - Open/Edit the file default.dic

Enhanced Buttons

Using Buttons as Sprites

- New Movable and Scalable bitmap buttons
  - Allows buttons to be used to show image or object
  - User can drag buttons
  - Image will be scaled automatically to fit button

- Allows simple display of real-world environments:
  - Restaurant layouts   - Table placements
  - Car park   - Find vehicles
  - Warehouses   - Help locate inventory
  - Hotels   - Display room layout

Enhanced Buttons

Movable Buttons

- Movable buttons can be dragged to a new position
  - Button 'click' event triggers when mouse released
  - New position can be found in either:
    - 'Col and 'Line
    - 'Left and 'Top

- Two ways to make a button moveable
  - On create include OPT="M"
  - Set the 'Moveable button property to 1

Enhanced Buttons

- New option to place image Scaled and Behind Text
  - Image will scale to button size
    - Aspect ratio will be preserved
    - Image centered in the button
  - Text, if any, will appear centered on top of image

- Two ways to set image scaled and behind text
  - On create include OPT="C"
  - Set the 'BitmapPosition button property to 5

For image button only use flat transparent buttons (OPT="CTF")

Improved Image Option Support

Imaging Option on Controls

- Control images now support following picture options:
  - <u>R</u>otate:*angle*   - Rotate image counter clockwise
  - <u>I</u>nvert   - Inverse image (black-white)
  - <u>B</u>lackwhite   - Convert image to black and white grayscale
  - <u>F</u>lip:*flip*   - Flip image (<u>H</u>orizontal, <u>V</u>ertical, <u>B</u>oth)
  - <u>C</u>rop:*x1:y1:x2:y2*   - Crop the image at specified pixels

Combine rotation, moveable, scaled image buttons to make a sprite

Don't Forget
Image size changes
with rotation!

Ability to Load Data Faster

New 'LoadPoint Option for LIST_BOX and GRID

- Property 'LoadPoint used to define where LOAD data inserted
  - 0   - Data replaces existing data in list
  - >0   - Data inserted at index specified and 'LoadPoint reset to 0
  - -1   - Data appended to existing data in list

New with PxPlus 2019

  - -2   - Data replaces contents starting at 'Item which will be updated

  - Allows fast and easy loading of lists by sending blocks of data
  - Can be used with background loading

Ability to Load Data Faster

Sample Logic Using 'LoadPoint Option -2

```
   lb=10
   list_box lb,@(40,5,40,20),fmt="[Inv]l10 [Cust]l30",opt="rV",sep=";"
   open (1,iol=*)"invhdr"
   open (2,iol=*)"client"
!
   lb'ItemNeededCtl=100
   lb'itemCount=num(fin(1,"NUMREC"))
!
   while 1
     obtain (0)'BI',*,'EI'
     if ctl=4 or eom=esc then break
     if ctl=100  then gosub Update_list
   wend
!
   end
```

```
Update_list:
   data$=""
   rnoFrom=lb'ItemNeededFrom,   rnoTo=lb'ItemNeededTo
   if rnoFrom=0 or rnoTo=0  then return
!
   for recno=rnoFrom to rnoTo
     read data from "" to iol=iol(1),iol=iol(2,rec=cst$)
      if recno=rnoFrom \
        then read (1,rno=recno,dom=*next) \
        else read (1,end=*break)
     read (2,key=clientid$,rec=cst$,dom=*next)
     data$+=invoicenumber$+";"+cst.ClientName$+sep
   next
!
   lb'loadpoint=-2,   lb'item=rnoFrom
   list_box load lb,data$
   return
```

Previously set 'Item to record number, then changed 'ItemText$ MUCH SLOWER

Grid Control

- Improved handling of locked cells
  - Optional non-locked background color
    - Easier to substitute Grid for List box
  - Enabled copying of locked cell contents

- Automatic adjustment of default Row height based on Font
  - Will not adjust any row whose height = 0

- New 'LockTopRows to exclude rows from sort
- Option to use old-style 'Multi-line' input handling
  - Disables direct entry of ENTER (CR) and Up/Down arrows

Improved Drop Box Handling

Multi-keystroke Searching

- User can type multiple characters to position list
  - Used ONLY to search first character based on entry

  - Multiple characters typed rapidly now searched
    - Characters must be entered within ½ second of each other
    - Maximum of 8 characters

- Supported in regular Drop Box and in Grid

Hover Detection by Co-ordinates

SETMOUSE Enhancement

- New option for SETMOUSE directive

SETMOUSE @(col,line,cols,lines) **^** *ctl_value*

- Will generate the *ctl_value* when mouse moved over region specified
- Ideal for having custom Tips or Hover initiated information

- Works locally and when using WindX
  - Currently not supported by *i*Nomads

Improved Windows Font Handling

Resolved: Windows Default Font Problems

- Default graphical font in Windows is "MS Shell Dlg"

> The default graphical font in Windows is "MS Shell Dlg"
>
> It DOES not really EXIST!

- Using this causes problems with RTF and PDF files
  - Font not found will result in default font being used with unexpected results
  - It's virtually identical to Segoe but sizes slightly different

- PxPlus 2019 maps MS Shell DLG to Segoe for RTF and PDF files

The 'PICTURE' Mnemonic

- New Mode: 'PICTURE'(x,y,x,y,pathname$,*mode*)

Mode	Description	Mode	Description
0	Draw asis, Top left aligned	4	Color blended scale to fit
1	Center and crop within region	5	Scale with aspect ratio, position top left
2	Scale to fit region	6	Scale with aspect ratio and center
3	Tile to fill region	7	Scale to cover, center, and crop

Mode 7 not supported by *PDF*
Uses Mode 6

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The 'TEXT' Mnemonic

- New formatting option "E"

  - Indicates output with ellipsis (…) if needed
  - May be used for single line 'TEXT' mnemonics (no wrapping)
  - Requires both start and end co-ordinates

```
PRINT      'RECTANGLE'(x,y,x1,y1),
           'TEXT'(x,y,x1,y1,"Some very long text that won't fit", "E"),
```

Some very long text that …

BITMAP Enhancement

Image Files Made Easy

- Simplifying how images are created dynamically
  - *BITMAP* based the image size on LENGTH= and WIDTH= options
    - These options defaulted to Inches or Millimeters
    - Had to set/consider DPI= to establish actual image size

  - Added option to specify px following LENGTH= and WIDTH= options
    - To create a 100x50 image

  > OPEN (HFN) "*BITMAP*;WIDTH=100px;LENGTH=50px"

    - Save FILE (nn) can create BMP, JPG or PNG from this file

New Charting Object

- All new charting object

  - Better, faster, more functional charting through PxPlus object

  More details at Charting 101 and New Chart Object PDF

CORE LANGUAGE ENHANCEMENTS

Core Language Enhancements

- New Language Features

    - New IOL( ) functionality
    - New hashing options
    - Changes to SSL interface for PEM files
    - Built in PDF driver enhancements
    - Array handling changes and enhancements

IOL Function

New Capabilities for Handling IOLISTS

- Added ability to extract IOLIST from un-opened file/table
  - IOL(FILE "*path*")   - Returns IOLIST from file specified in *path*
  - IOL(TABLE "*table*")   - Returns IOLIST from *table*

- The REC= clause now applies prefix to all variables in IOLIST
  - May be used to prefix variables in IOLIST
  - Typical uses include:
    - READ DATA to clear record fields
    - Passing prefixed fields to a subroutine

PxPlus Hashing Function

- Hashing is a mathematical function that maps data of any size into fixed sized data
  - Typical uses include:
    - Password storage
    - Blockchain (Bitcoin)
    - Data/Message integrity (CRC/LRC)

- HSH(…) function to hash data

hashstring$ = HSH(*string$, hashtype*)

Supported Hash Types

Hash Type	Description
0	PxPlus 2-byte hash (default, if not specified))
1	MD5 *
2	MD4 *
3	MD2 *
4	SHA-1 *
5	MDC2 *
6	RIPEMD *
7	HMAC *
224	SHA-224 (28-byte value) *
256	SHA-256 (32-byte value) *
384	SHA-384 (48-byte value) *
512	SHA-512 (64-byte value) *
-1	SHA-1 – (20-byte value)

* Indicates uses OpenSSL libraries (all other hashing uses internal logic)

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224	SHA-224 (28-byte value) *
256	SHA-256 (32-byte value) *
384	SHA-384 (48-byte value) *
512	SHA-512 (64-byte value) *
-1	SHA-1 – (20-byte value)
-2	SHA-256 (32-byte value)

* Indicates uses OpenSSL libraries (all other hashing uses internal logic)

SHA-256 Hashing

- SHA-256 hashing (*hashtype* 256)

hashstring$ = HSH(string$, 256)

  - Relies on OpenSSL to perform hashing

- Internal SHA-256 hashing (*hashtype* -2)

hashstring$ = HSH(string$, -2)

  - No dependency on OpenSSL and faster
  - Returns HTA( ) of the actual hash; suitable to store in files with delimiters

Chunked Hashing

Getting Around Memory Constraints

- Common to hash large amounts of data
  - HSH function requires passing 'complete' string
  - Requires data to be in memory limited to space available

- PxPlus 2019 added option to hash the data in chunks
  - Uses less memory
  - Computation of hash on data of virtually unlimited length
  - Only available on these internal hash types
    - SHA-1 (-1)
    - SHA-256 (-2)

Chunked Hashing

How to use Hash in Chunks

- Process involves three steps

1) Initialize the hash process by passing first chunk and null string in 2nd param

- chunkedhsh$ = HSH(firstchunk$, "", -2)

2) Pass a chunk of data to process and value returned by initialization

- chunkedhsh$ = HSH(nextchunk$, chunkedhsh$, -2)

3) Finalize by passing null data and value returned from last chunk

- completehsh$ = HSH("", chunkedhsh$, -2)

Chunked Hashing

- Typical SHA computation for large file

```
 open (1,isz=1)"bigfile"
!
 chunkedhsh$ = ""
!
while 1
 read record (1,siz=10000,end=*break) chunk$
 chunkedhsh$ = hsh(chunk$,chunkedhsh$,-2) !   Update hash for this chunk
wend
!
bigfilehsh$ = hsh("",chunkedhsh$,-2) !   Finish hash with no data
```

Revised PEM files

SSL/TLS Interface Enhancement

- PxPlus 2019 enhanced to allow two PEM files
  - Certificates
  - Private key

> SECURE=*certificate_file*   *(defines path to certificates)*
> PRIVKEY=*private_key_file*   *(defines path to private key)*

- Includes a new system utility to convert PFX to PEM files

> CALL "*tools/pfxcertconvert ", *pfxpath$, pfxpswd$, pempath$*

PDF Driver Enhancements

- Now supports PNG image files in PDF
- Added Hyperlink options to both 'PICTURE' and 'RECTANGLE'

To attach HYPERLINK to a Picture

- 'PICTURE'(1,1,100,100,"C:\my_app\abc\resources\mylogo.png , <https://www.mycompany.com>",2)

To attach HYPERLINK to a region in document based on Rectangle

- 'RECTANGLE'(200,200,600,600,0,"<https://www.mycompany.com>")

- Style of 'TEXT' Hyperlink (font/color) inherited by including "I" in the attributes

Passing Arrays

Now Passed by Value (Read Only)

- You can pass READ-Only array by surrounding it with parenthesis

CALL "*someprogram",* **(** MyArray{ALL} **)**

- Either String or Numeric arrays can be passed
  - Associative arrays can also be passed with associated keys copied

- Only allowed to pass full array not a partial range
- System makes internal copy of array values
  - Effectively doubles memory requirements for an array

Associative Arrays

Improved Memory Management

- To remove key from an Associative array

X = DIM(DROP *arrayName* ["*keyvalue*"])

- Prior to PxPlus 2019
  - Only dropped key reference to element in array
    - Left array element thus did not free memory
  - Had to use CLEAR or BEGIN to clear array elements

- PxPlus 2019 now frees element
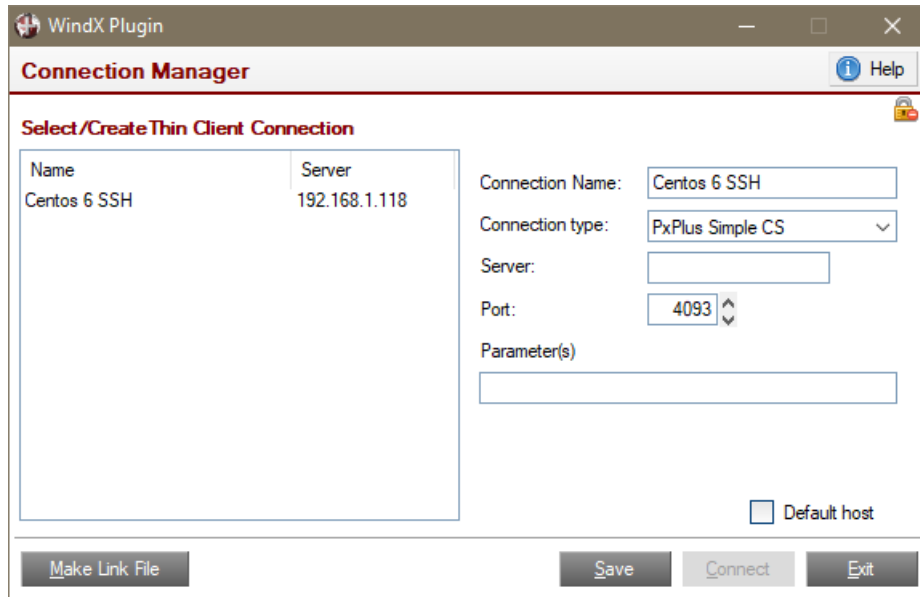 - Revert to old logic by issuing:

SETDEV (0) Set "OldDimDrop" To "Yes"

WINDX CHANGES

Security Mode Changes

- New options to set/reset security settings in Launcher

- Click Lock on top right
- Option to Disable/Enable security

Security question also asked during software install

User Security Codes

- Optional validation of security code by Simple CS
- Simple CS workstation host name includes Userkey=*passcode* option

> C:\....\pxplus.exe *plus\cs\client –arg "hostname;4093;Userkey=*somevalue*"

- Host maintains file of security codes specified by Userkeys=*path* option

> C:\....\pxplus.exe *plus\cs\host –arg "4093;Userkeys=*somepath*"

  - File is a simple text file with userid=passcode
    - Connection compares workstation userid against passcode
    - Optional userid of "*" for passcode that any user can use

> **Mike=AbraCadabra**
> **Len=Softball**
> ***=SkyWalker**

- Workstation connection rejected if no match in passcode file

*i*NOMADS

*i*Nomads

- All applicable new control options/features implemented
  - SETMOUSE hover *not* implemented
- New *i*Nomads exclusive functionality added
  - Now supports 'PUSH' mnemonic
  - Added 'Relaunch' link on application exit pages
  - PxPlus 2019 Update 1 includes ability to change "System Loaded" message
    - New *plus/inomads/sys_loaded.htm file
  - Enhanced Drop boxes for iPhone and iPad
  - Special *i*Nomads button classes targeting Smartphones
    - link_mailto   - launches browser mail application
    - link_tel   - initiates phone call
    - link_http   - open URL in browser

Recap

- Product bundle changes
  - Base bundle now almost same as Professional less WindX and ODBC
  - Professional bundle unchanged
  - E-Commerce bundle now Web bundle and includes *i*Nomads

- New graphical features
  - As-you-type spell checking and auto-correct
  - Image handling and moveable buttons help allow creation of Sprites

- Core language improvements
  - IOL and Hashing improvements
  - PDF file hyperlinks
  - Array handling

- Majority of product enhancements included in *i*Nomads

Additional Resources

- [PxPlus 2019 Release Notes](#)