PxPlus Unbound Integration

PxPlus 2016 (v13)

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Agenda

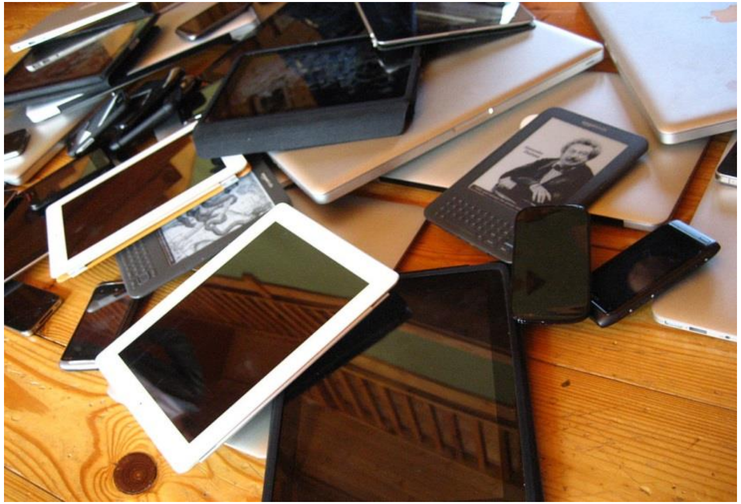
- Messaging integration
  - New SMS send utility
  - Test email and email utility
- COM integration
  - COM overview
  - New SimpleCOM example
- Data integration
  - Enhanced FTP utility
  - Enhanced PxPlus SQL ODBC Driver

Messaging Integration

Send messages from your application

Messaging Integration

- Everyone has mobile devices



- How can you connect with them?

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Messaging Integration

- Connect with your users in new ways by integrating with outside messaging systems
  - SMS text messaging
  - Email

New SMS Send Utility

- New SMS send utility: *tools/sms
  - Easily send text messages from your program
- SMS web services supported

Name	Website	Group	International
SMS Matrix	http://www.smsmatrix.com/	Yes	Yes
EZ Texting	https://www.eztexting.com/	Yes	No
Group Texting	https://www.grouptexting.com/	Yes	No
Nexmo	https://www.nexmo.com/	No	Yes
Twilio	https://www.twilio.com/	No	Yes

How to Use SMS Send Utility

- To send a SMS text message call *tools/sms;send

```
CALL "*tools/sms;send", smsService$, accountInfo$, to$, message$
```

  - Based on choice of SMS web service

smsService$	accountInfo$
“smsmatrix” “eztexting” “grouptexting”	"username;password"
“nexmo”	"api_key;api_secret;nexmo_phone_number“
“twilio”	"account_sid;auth_token;twilio_phone_number"

How to Use SMS Send Utility

- To send a SMS text message call *tools/sms;send

```
CALL "*tools/sms;send", smsService$, accountInfo$, to$, message$
```

  - Phone number format is 15551234567
    - Not international: don’t include country code i.e. 5551234567
  - If message$ larger then 160 characters, it will be split into multiple text messages

SMS Send Utility Demo

- Credit limit SMS text message warning
  - Canadian Automotive Toys Store Demo
    - Client notification setting
    - Notification sent when credit limit exceeded via new invoice

New Email Test Utility

- New email test utility: *web/testemail
  - Sends test email to many addresses
  - Displays required *web/email code
  - Validates SMTP server and security

Test Type	Description	Port
test	Connects unencrypted	25
ssl_test	Connects vis SSL encryption	465
starttls_test	Connects vis STARTTLS encryption	587

  - Displays helpful error messages

How to Use Test Email Utility

- Send test email by calling *web/testemail

```
CALL "*web/testemail;test", from$, smtpServer$, username$, password$, to$
CALL "*web/testemail;ssl_test", from$, smtpServer$, username$, password$, to$
CALL "*web/testemail;starttls_test", from$, smtpServer$, username$, password$, to$
```

  - The default port can be overridden via smtpServer$
  - Ability to send test email to a list of addresses

Email Utility

- The email utility: *web/email
  - Send emails from your application
  - Send mime-compliant messages
    - text
    - html
    - multimedia: images, sounds, and videos
  - Send attachments
  - Request receipt or read confirmation

Email Utility

- Specify message priority
- Generate .EML files
  - *web/outbox if no SMTP server specified
  - *web/outbox/new before it is sent
  - *web/outbox/send or another directory after it is sent

- Advanced utility
  - Configurable with many options
  - Use output of *web/testemail then customize

How to Use Email Utility

- To send email call *web/email

```
CALL "*web/email", fromAddress$, replyAddress$, toAddress$, ccAddress$,
bccAddress$, subject$, message$, attachments$, option$, smtpServer$,
serverTimeout, lineWrapsAt, bodyEncoding$, eraseIt, errorMesg$,
sendDirectory$, savedFilename$
```

  - message$ supports embedded files/multimedia
  - option$ sets priority or turns on delivery/read receipts
  - smptServer$ specifies the address, port, username, password, and SSL setting
  - eraseIt controls sent .EML file creation

Email Utility Demo

- Credit limit email warning example
  - Canadian Automotive Toys Store Demo
    - Client notification setting
    - Notification sent when credit limit exceeded via new invoice
  - *web/testemail used to generate *web/email call

COM Integration

Work with external components

COM Integration

- Component Object Model
  - Control .NET components using an object interface
  - COM also known as OLE/OCX/ActiveX

- COM component examples
  - Excel
  - Progress bar control
  - Shell Explorer control

COM Integration

- Work with .NET components via COM objects
  - Get and set COM object properties
    - Obtain information from the .NET component
    - Change the behavior of the .NET component
  - Execute COM object methods
    - Make the .NET component do the work
  - Subscribe to COM object events
    - React when something happens in the .NET component
      - Button click
      - File save

COM Component Browser

- PVXTLB.EXE
    - Lists COM components on system via Open
    - Type information about COM objects
        - COM name/Class and GUID
        - Descriptions of methods, properties, and events
    - Generate PxPlus object for event handling
    - Download from: http://ftp.pvxplus.com/downloads/misc/PVXTLB.EXE

Working with COM Objects

- Create and initialize COM object

```
DEF OBJECT ExcelHandle, “Excel.Application”
DEF OBJECT ExcelHandle, “*”
```

  - Special case “*” lists all ActiveX COM components

Working with COM Objects

- Work with COM object
  - Access properties and methods via ‘ (tick)

```
ExcelHandle’Calculate()
ExcelHandle’Visible
```

  - List all methods and properties via ‘* (tick asterisk)

```
PRINT ExcelHandle’*
```

Working with COM Objects

- Extended properties and methods
  - pvxHandle
    - Container window handle
  - pvxIsA$
    - Internal COM object class name
  - pvxDescribe$(*member$*)
    - Information describing the member, its return type, as well as parameters and their types
  - +*More*

Working with COM Objects

- Extended helper objects
  - Used for COM data handling
  - `*Variant`
    - Store any data type
    - Optionally passed by reference
    - Convert PxPlus data types to automation types
  - `*VarArray`
    - Each element can accept data of any type
    - Passed by reference
  - +*More*

Working with COM Objects

- Disconnect COM object and cleanup resources
  - Two options available using different directives

```
DROP OBJECT ExcelHandle
DELETE OBJECT ExcelHandle
```

Working with COM Events

- A couple of options to subscribe to COM events
  - Link events to COM event object

```
ExcelEvents = NEW(“ExcelEvents”)
ON EVENT FROM ExcelHandle PROCESS ExcelEvents
```

  - Generate a CTL on COM event

```
ON EVENT “SheetChange” FROM ExcelHandle PREINPUT 500
```

Working with COM Events

- COM event object
  - Requires a method written for each event to be handled

```
DEF CLASS “ExcelEvents”
FUNCTION SheetChange(sheet, target) SHEET_CHANGE FOR EVENT SAME
END DEF
SHEET_CHANGE:
ENTER sheet, target
! Handle event here
RETURN
```

    - TCB(120) returns a handle to the COM object
  - Can be generated via PVXTLB.EXE

Working with COM Events

- Unsubscribe from events
  - Unlink events from a COM event object

```
ON EVENT FROM ExcelHandle PROCESS 0
DROP OBJECT (“ExcelEvents”)
```

  - Stop generating CTL for COM event

```
ON EVENT “onChange” FROM ExcelHandle PREINPUT 0
```

.NET With no COM Interface

- Some .NET components have no COM interface
  - Barcode scanner
  - Credit card reader
  - Phone system
- How do you work with them from PxPlus?
  - No easy interactive way that supports events
  - Need to build COM wrapper for .NET component

COM Wrapper

- Written in .NET language i.e. C#, VB.NET, etc.
- Import .NET component
- Define COM class object
  - Wrapper for .NET component
  - Define COM interfaces
  - Syntax is defined by the COM standard

COM Wrapper Example

- An example, to better understand a **COM** wrapper
  - The SimpleCOM example

Component	Description
SimpleCOM	Visual Studio solution that contains the two projects listed below 1. SimpleApp - Application/Library Project 2. SimpleCOM - **COM** Wrapper Project
SimpleCOMEvents	PxPlus **COM** event object with logic to handle event in PxPlus
SimpleCOMTest	PxPlus test program

  - Download from: http://ftp.pvxplus.com/downloads/misc/SimpleCOM.zip

COM Integration Demo

- Demo subscribing to an event from SimpleApp using the COM wrapper SimpleCOM
  - SimpleApp is a dialog box with a button that counts number of clicks

- Walkthrough SimpleCOM example code

Data Integration

Your data anywhere

Data Integration

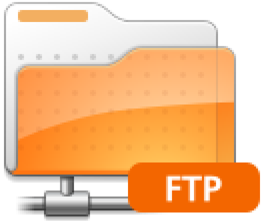
- Easily exchange data over a network
  - Send reports to stake holders
  - Download images and documents

Data Integration

- Bring you business data to life using business intelligence and data visualization tools
  - Excel/PivotCharts
  - Crystal Reports

FTP Utility

- Original FTP utility
  - Handles FTP communication manually
  - Limited FTP protocol support
  - Performance not ideal



Enhanced FTP Utility

- Major enhancements
  - Uses industry standard tool curl for FTP communication
  - Full FTP protocol support
  - SFTP support Planned for 2017
- Massive speed improvement
  - 10 to 20 times faster than previous utility

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Enhanced FTP Utility

- Easier to use
  - Supports both \ and / as a directory delimiter
  - Optional directory delimiter at end of directory path

- Regular expression support added to file list
  - Use powerful MSK() pattern matching

- New list command
  - Get a directory listing from a FTP server

How to Use FTP Utility

- To list a FTP directory call

```
CALL "*web/ftp;list", ftpServer$, user$, password$, timeout, recursion,
result$
```

  - To list a sub-directory append it to the ftpSevrer$
  - The directory listing or error is returned via result$

How to Use FTP Utility

- To transfer files via FTP call *web/ftp

```
CALL "*web/ftp;send", ftpServer$, user$, password$, timeout,
filesToSend$, uploadDir$, case$, result$

CALL "*web/ftp;receive", ftpServer$, user$, password$, timeout,
filesToReceive$, downloadDir$, case$, result$
```

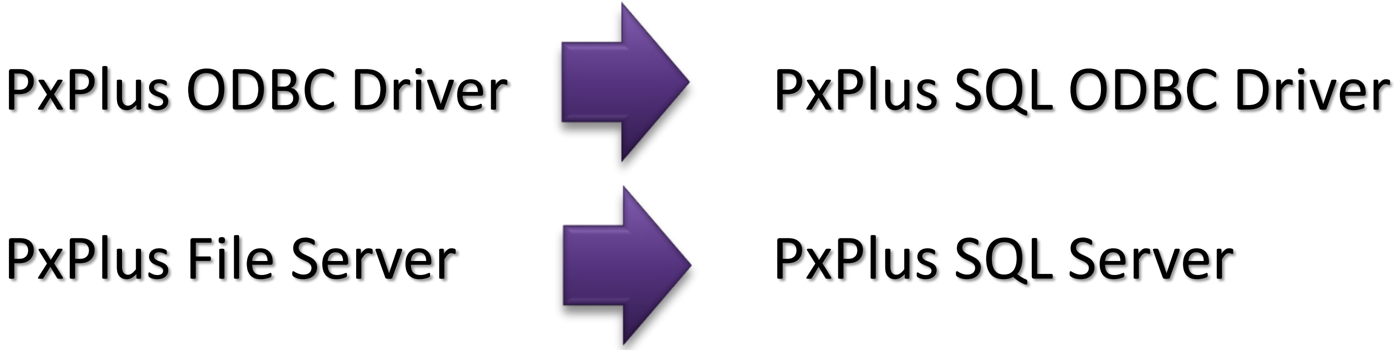
  - filesTonnn$ list of files/directories to transfer
    - ASCII/binary, overwrite, recursion, and wildcard/mask options
    - Wildcards (* or ?) or regular expressions (MSK())
    - Example: Data|B2R;Reports*.pvr|B0

FTP Utility Demo

- Generate and upload reports example
  - Upload generated PDF report to demo FTP server

Enhanced PxPlus SQL ODBC Driver

- Introducing the new SQL ODBC products
  - Many new features and enhancements
  - SQL is now in the name



PxPlus ODBC Driver → PxPlus SQL ODBC Driver

PxPlus File Server → PxPlus SQL Server

Enhanced PxPlus SQL ODBC Driver

- More platforms supported
  - 64-bit UNIX/Linux PxPlus SQL Server
    - Views support with 64-bit PxPlus
    - No need for 32-bit libraries
  - UNIX/Linux PxPlus SQL ODBC Driver
    - iSQL
    - LibreOffice
    - Apache/PHP

Enhanced PxPlus SQL ODBC Driver

- Previous ODBC driver conforms to older standards
  - Incompatible with some ODBC applications
    - Visual Studio
    - Excel Data Connection Wizard
    - OLE DB ODBC and .NET ODBC providers

- New PxPlus SQL ODBC Driver conforms to the latest ODBC standards
  - Compatible with all ODBC applications

More Flexible SQL Syntax

- Required escape syntax for joins, dates, and functions

```
SELECT C.ClientId, {FN UCASE(C.ClientName)}, I.InvoiceNumber, I.DueDate
FROM {OJ ‘Client Master File’ C
LEFT JOIN ‘Invoice Header’ I ON C.ClientId=I.CLientId }
WHERE I.DueDate <= {D ‘2016-12-31’}
```

- Still supported but now optional

```
SELECT C.ClientId, UCASE(C.ClientName), I.InvoiceNumber, I.DueDate
FROM ‘Client Master File’ C
LEFT JOIN ‘Invoice Header’ I ON C.ClientId=I.CLientId
WHERE I.DueDate <= ‘2016-12-31’
```

More Flexible SQL Syntax

- Comments are now supported

```
//this is a line comment
/* this is a
   multi-line comment */
```

- Automatic conversion
  - In PxPlus, 0/”” and NULL are the same, in SQL they are not
    - 0/”” <-> NULL
  - String -> number

More Flexible SQL Syntax

- Nested 3+ table join syntax

```
SELECT *
FROM {OJ ‘Invoice Header’ I
LEFT JOIN ‘Client Master File’ C
    LEFT JOIN ‘Sales Rep’ S
    ON C.SalesRep=S.SalesRepCode
ON I.ClientID=C.ClientID }
```

- Modern 3+ table join syntax

```
SELECT *
FROM ‘Invoice Header’ I
LEFT JOIN ‘Client Master File’ C ON I.ClientID=C.ClientID
LEFT JOIN ‘Sales Rep’ S ON C.SalesRep=S.SalesRepCode
```

New SQL Syntax

- table1 RIGHT [OUTER] JOIN table2 ON boolean
  - Returns all rows from the right table (table2), with the matching rows in the left table (table1)
  - The result is NULL on the left side when there is no match

```
SELECT *
FROM ‘Client Master File’
RIGHT JOIN ‘Sales Rep’ ON SalesRepCode=SalesRep
```

New SQL Syntax

- `CAST(expression AS sql_type [(integer1[, integer2])]) / CONVERT(expression, sql_type)`
  - Convert/Cast result of an expression to a SQL data type
  - CAST optionally allows modifiers for
    - Length
    - Precision and optionally scale

```
SELECT CAST(ClientID AS SQL_NUMERIC (6, 0)) FROM ‘Client Master File’
SELECT CONVERT(ClientID, SQL_NUMERIC) FROM ‘Client Master File’
```

New SQL Syntax

- `CASE expression WHEN expression THEN expression END / CASE WHEN boolean THEN expression END`
  - Evaluates conditions and returns one of multiple possible result expressions
  - Two formats:
    - Simple CASE format compares an expression to a set of simple expressions
    - Searched CASE format evaluates a set of Boolean expressions
  - May have more then one WHEN clause
  - Both formats support an optional ELSE

New SQL Syntax

- Example

```
SELECT
CASE CRLimitNotify
WHEN ‘N’ THEN ‘None’
WHEN ‘T’ THEN ‘SMS Text Message’
WHEN ‘E’ THEN ‘Email Message’
END
FROM ‘Client Master File’ WHERE ClientID=‘054703’

SELECT
CASE
WHEN CRLimitNotify=‘T’ OR CRLimitNotify=‘E’ THEN ‘Notification On’
ELSE ‘Notification Off’
END
FROM ‘Client Master File’ WHERE ClientID=‘065853’
```

New SQL Syntax

- select UNION [ALL] select
  - Combines the results of two or more select statements
  - Removes duplicates and sort results unless ALL is used
  - select statements must have the same number of columns
  - Columns must have similar data types in same order

```
SELECT *
FROM DivisionOneClients
UNION
SELECT *
FROM DivisionTwoClients
```

New SQL Syntax

- HINT KEY keynum
  - In almost all cases, the best key is selected for file I/O
  - Use HINT KEY to force the use of a specific keynum

```
SELECT *
FROM ‘Client Master File’
WHERE ClientID>’200000’ OR PhoneNumber<>””
HINT KEY 3
```

PxPlus SQL ODBC Driver Demo

- Excel data visualization
  - Query the data via SQL ODBC
  - Use PivotTables and PivotCharts to visualize the data

Enhanced PxPlus SQL ODBC Driver

- Speed enhancements
  - Optimized independent sub-queries
  - Optimized access to views with date keys

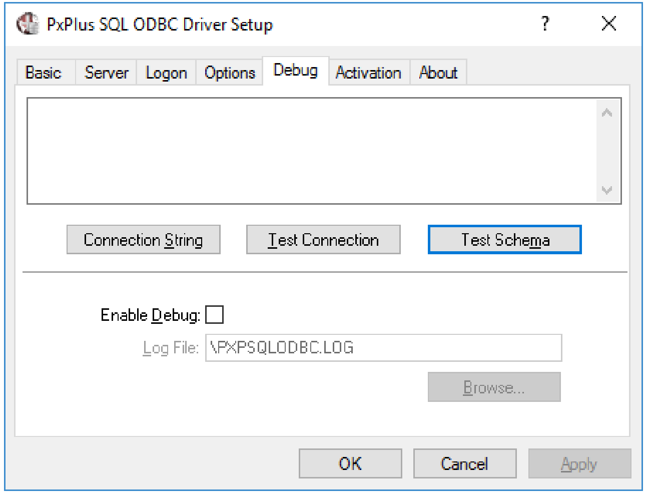
- Tips to improve speed
  - Minimize the amount of work the query has to do
  - Always use filters that involve keys, when possible
  - Create/Recreate files using
    - 'XK' parameter on
    - Large key blocks BSZ=31

Enhanced PxPlus SQL ODBC Driver

- Easier problem solving
  - Improved error messages
  - Improved documentation
    - Reorganized
    - New FAQ section: http://manual.pvxplus.com/?odbc/odbc_faq.htm
    - New examples section: http://manual.pvxplus.com/?odbc/using_odbc_driver/example_sql.htm

Enhanced PxPlus SQL ODBC Driver

- New Test schema button
  - Tests that it has access to all file and views in the data dictionary
  - Reports an error on the first file or view that cannot be accessed
  - Found in the Data Source Name Setup Debug tab



PxPlus SQL ODBC Driver Setup

Enable Debug: □

Log File: \PXPSQLODBC.LOG

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Enhanced PxPlus SQL ODBC Driver

- PxPlus SQL Command Line Client enhancements
  - Options
    - --version
      - Displays version info
    - --column-names
      - Displays column names with output
  - Command
    - LIST tablename
      - Returns the tables column info

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 2016 (version 13) release.

- SMS Utility
- Email Utility
- COM Control
- FTP Utility
- PxPlus SQL Server and PxPlus SQL ODBC Driver