isCOBOL™ Evolve

isCOBOL Evolve 2017 Release 1 Overview

isCOBOL Evolve 2017 Release 1 Overview

Introduction

Veryant is pleased to announce the latest release of isCOBOL™ Evolve, isCOBOL Evolve 2017 R1.

isCOBOL Evolve provides a complete environment for the development, deployment, maintenance, and modernization of COBOL applications.

The isCOBOL IDE is now based on Eclipse 4.5 Mars release, bringing powerful new aids to the developers, such as a Terminal View for command line use, GIT integration and filtered views.
List-box control has been revamped, by adding check boxes and radio buttons for easy multi o single item selection. Contents in list-box can now be exported to Microsoft Excel XLS and XLSX formats or copied to the system clipboard.
isCOBOL applications can now create and handle multi-platform system tray icons, which developers can leverage to bring even more features to end users.
Entry fields can now be spell-checked automatically, and allow placing bitmaps in both left and right edges of the text box to provide new user interface capabilities.
New library routines ease the job of user interface enhancements with easy to use calls.

The framework has been updated, with the new CtreeJ interface with high-performance in heady multi-threaded environments.
A new IsSort utility allows command-line or programmatic sorting, merging and filtering of indexed, relative and sequential files.
The compiler now creates more optimized classes, that use less memory and load faster, and can generate warning for unsupported statements in isCOBOL EIS html based solutions, and provide better migration support when moving from other COBOLs.
Application Server can now spawn multiple JVM processes and Thin Client applications consume less bandwidth for common statements.

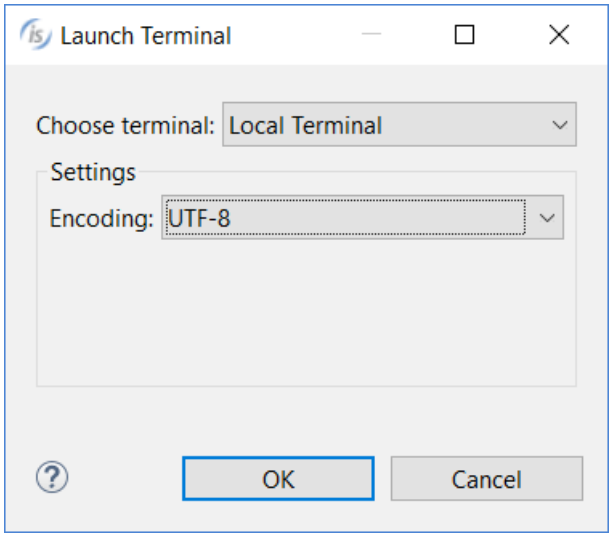
Details on these enhancements and updates are included below.

isCOBOL IDE Enhancements

The isCOBOL 2017R1 IDE is now based on Eclipse 4.5 Mars. These are some of the new features introduced with the new isCOBOL IDE:

- New IDE dark theme, which looks great for dark lovers.
- Powerful terminal emulator, providing access to the system terminal directly from the IDE, as shown in Figure 1, *Terminal configuration*

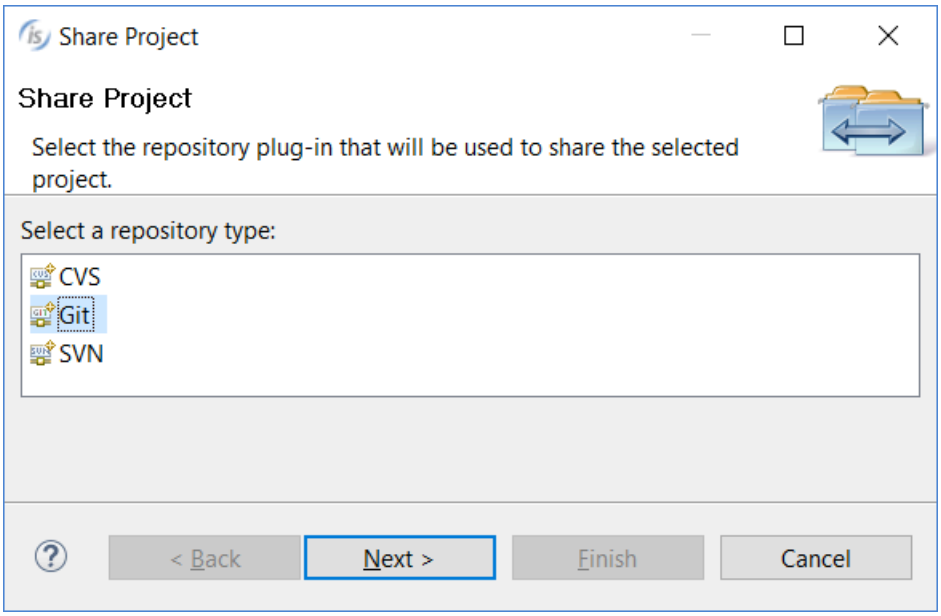
Figure 1. Terminal configuration



- New keyboard shortcuts to split editors horizontally (CTRL+_) or vertically (CTRL+{) allowing editing of two parts of a file at the same time.

- Native support of Git flow, as shown in Figure 2, *Git support*

Figure 2. Git support



- New meta-character filtering in the structural, file, and data view for easy navigation of large projects, as shown in Figure 3, *Filtering* and Figure 4, *Filtered view*.

Figure 3. Filtering

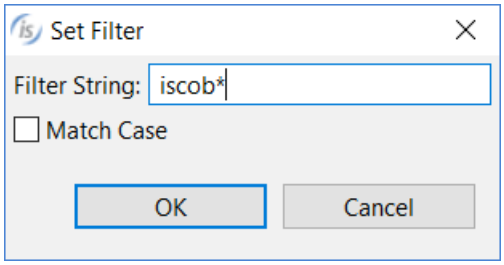
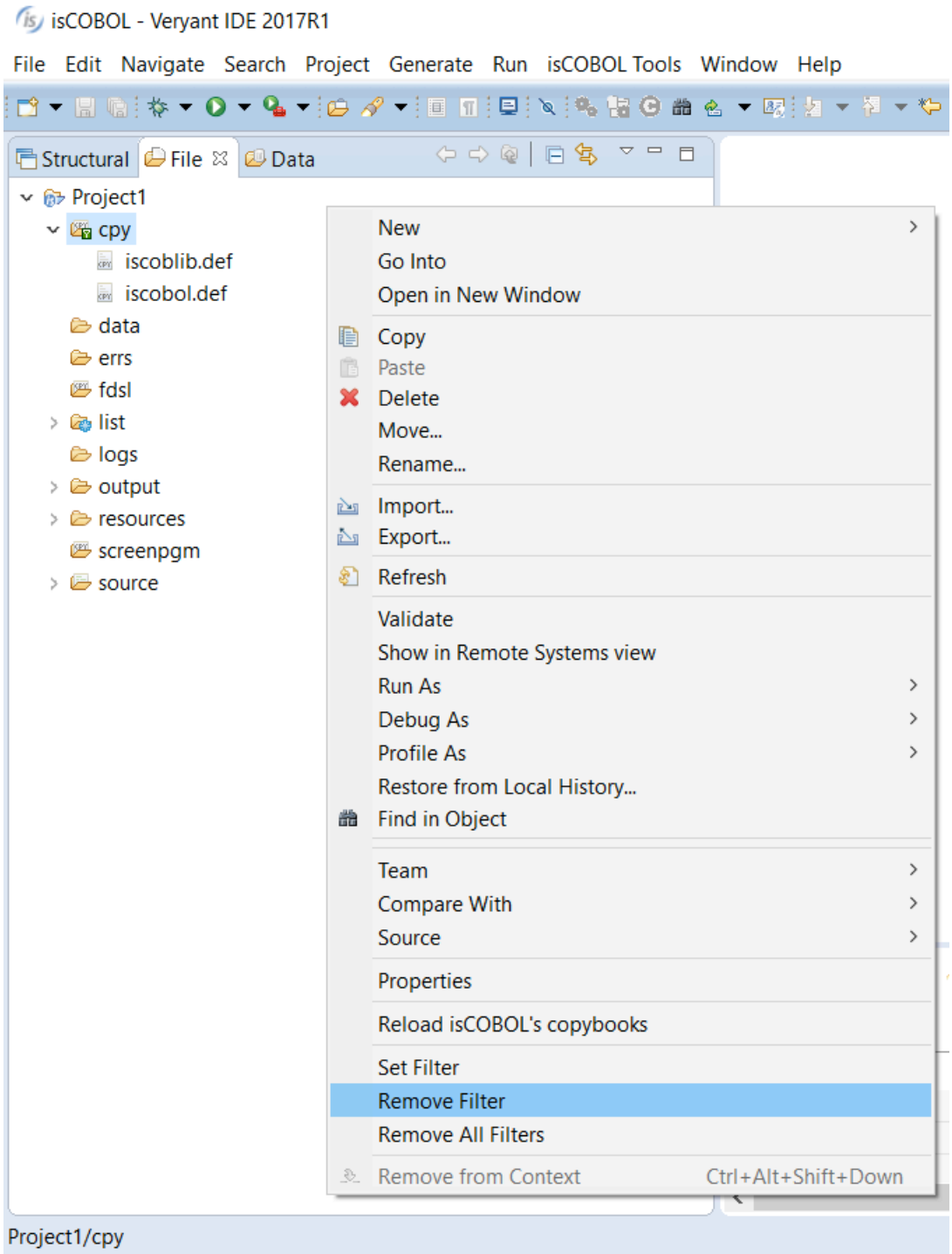


Figure 4. Filtered view

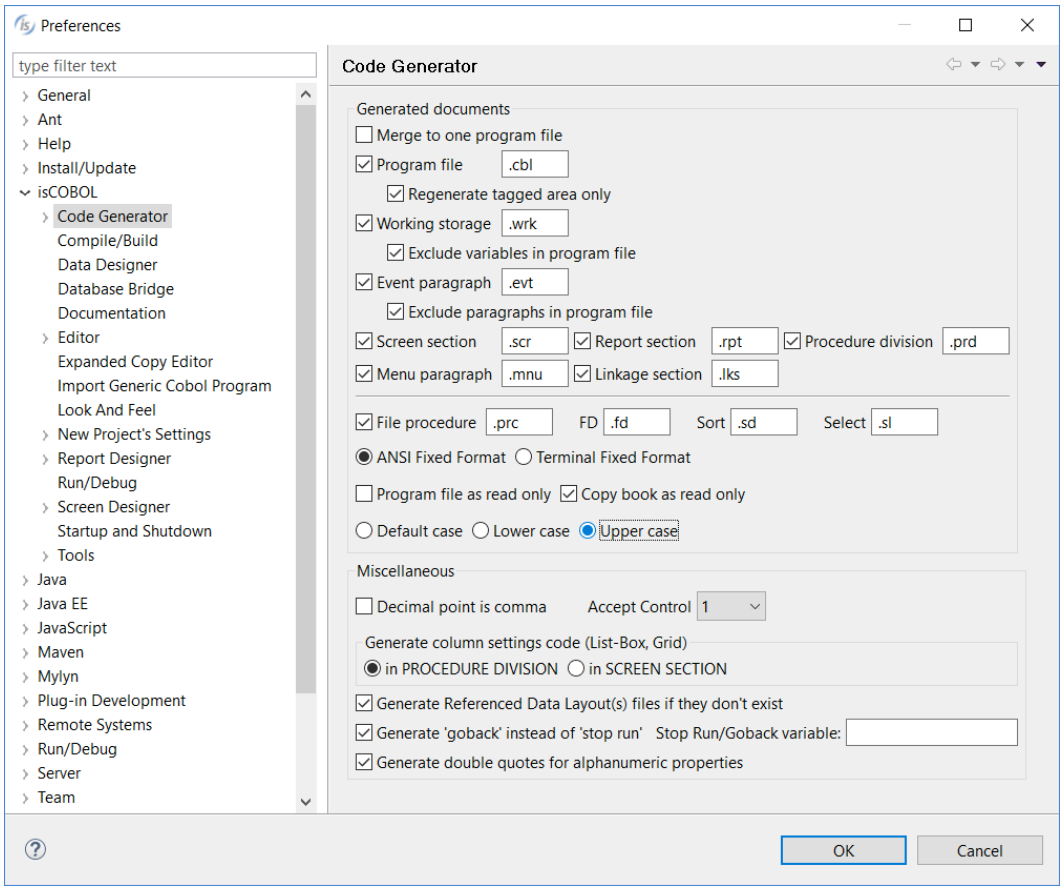


Eclipse's Local history feature is extended to support screen and report painters (.isp files) and file designer (.idl files). This allows easy rollback of recent code changes without using additional source versioning software.

Moreover, .isp files representing Screen Programs and .idl files representing a File Descriptions can be linked into the project, using Eclipse's file linking capabilities, allowing sharing of the source code between projects and developers.

Additional options on code generation have been introduced, to allow excluding automatically generated variables or paragraph, if they are already defined in the source code manually maintained outside the tagged areas. File extensions in the file procedure sections can now be customized, and code can be generated in upper or lower case, as shown in Figure 5, *Code Generator Options*:

Figure 5. Code Generation Options



Extensive enhancements have been made in the AcuBench migration wizard, improving compatibility with AcuBench 10, the ACUCOBOL-GT IDE.

New User Interface Features

The Entry-field control has been greatly enhanced with new features, and List-box has been upgraded as well. Also new is the ability to create a system tray icon.

New library routines have been implemented to simplify and enhance User Interface handling.

Entry-field control

Entry-fields now support bitmaps inside the entry-field. This allows showing a bitmap on either the left or right edge of the control, or on both. Click and double-click events can be intercepted, to programmatically implement behaviors when the user interacts with these bitmaps. A specific hint message can be set for each bitmap.

This is the list of all new properties available for this feature:

- BITMAP-HANDLE to specify the handle of the loaded bitmap
- BITMAP-WIDTH to set the width of each bitmap when a strip of bitmaps is used
- BITMAP-NUMBER to set the bitmap number to be displayed on the left edge
- BITMAP-DISABLED to set the bitmap number to be displayed on the left edge when the control is disabled
- BITMAP-ROLLOVER to set the bitmap number to be displayed on the left edge when the mouse is over the bitmap
- BITMAP- TRAILING-NUMBER to set the bitmap number to be displayed on the right edge
- BITMAP-TRAILING-DISABLED to set the bitmap number to be displayed on the right edge when the control is disabled
- BITMAP-TRAILING-ROLLOVER to set the bitmap number to be displayed on the right edge, when the mouse is over the bitmap
- BITMAP-HINT to set the hint text of the bitmap on the left edge

- BITMAP-TRAILING-HINT to set the bitmap on the right edge

The following new events are available on entry-field controls:

- MSG-BITMAP-CLICKED is fired when the image is single clicked

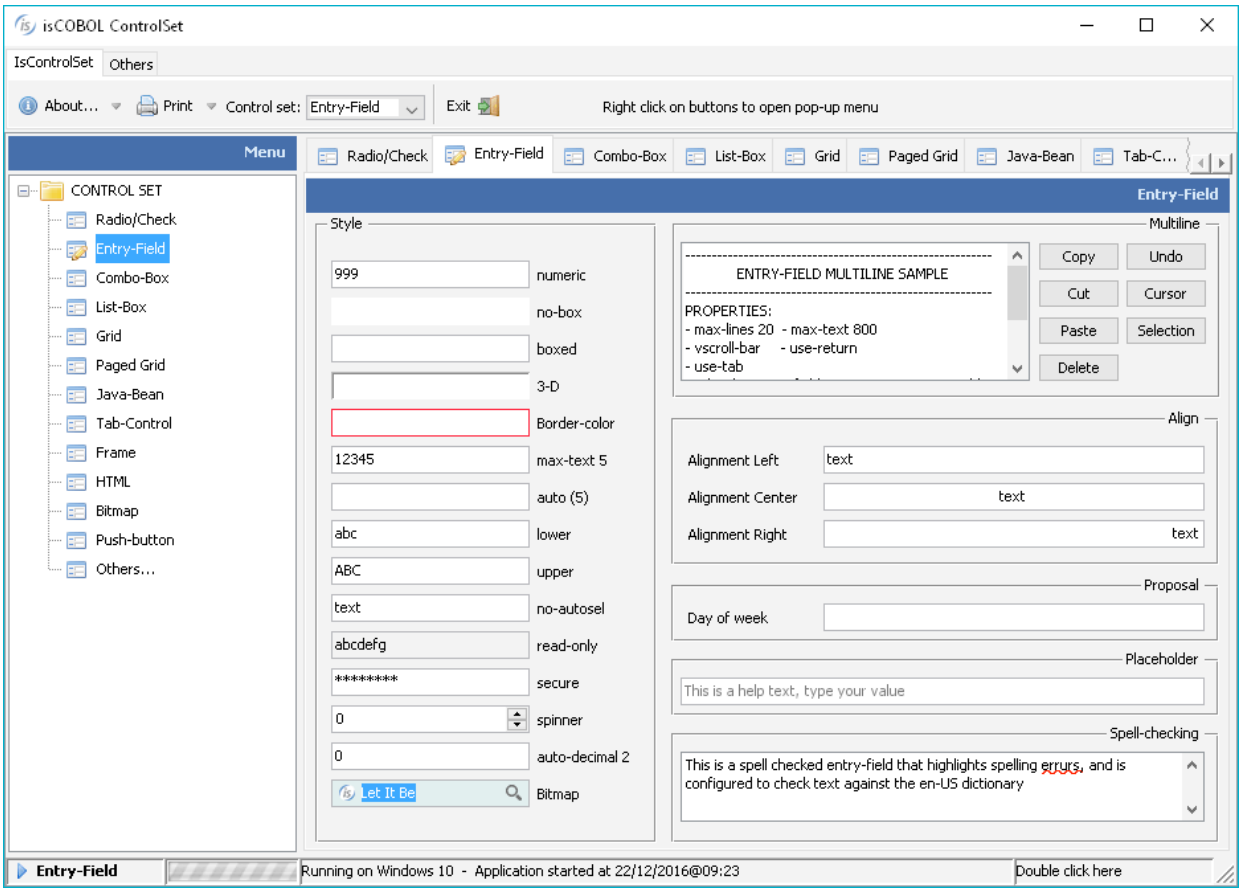
- MSG-BITMAP-DBLCLICK is fired when the image is double clicked

Entry-field controls now also support a new Spellchecker feature with suggestions, using the new property SPELL-CHECKING that can be set to a dictionary language.

The following code is used in the provided ISCONTROLSET sample, where the bitmaps and spell-checking features are used in the entry-fields shown in the last line (as shown in Figure 6, *Entry-field with bitmaps and spell-checking*).

```
05 ef-bmp entry-field
          bitmap-handle h-ef-icon
          bitmap-width 16
          bitmap-number 1
          bitmap-trailing-number 3
          bitmap-trailing-rollover 2
          bitmap-hint "Click here to copy text to clipboard"
          bitmap-trailing-hint "Click here to select a song"
          event EF-BMP-EV

05  spellcheck entry-field
               spell-checking "en-US"



EF-BMP-EV.
    evaluate event-type
    when msg-bitmap-clicked
       evaluate EVENT-DATA-1
       when 1
            modify ef-bmp cursor -1
            modify ef-bmp action action-copy
       when 2
            set event-action to event-action-terminate
            set perform-lookup to true
       end-evaluate
    end-evaluate.
```

Figure 6. Entry-fields with bitmaps and spell-checking



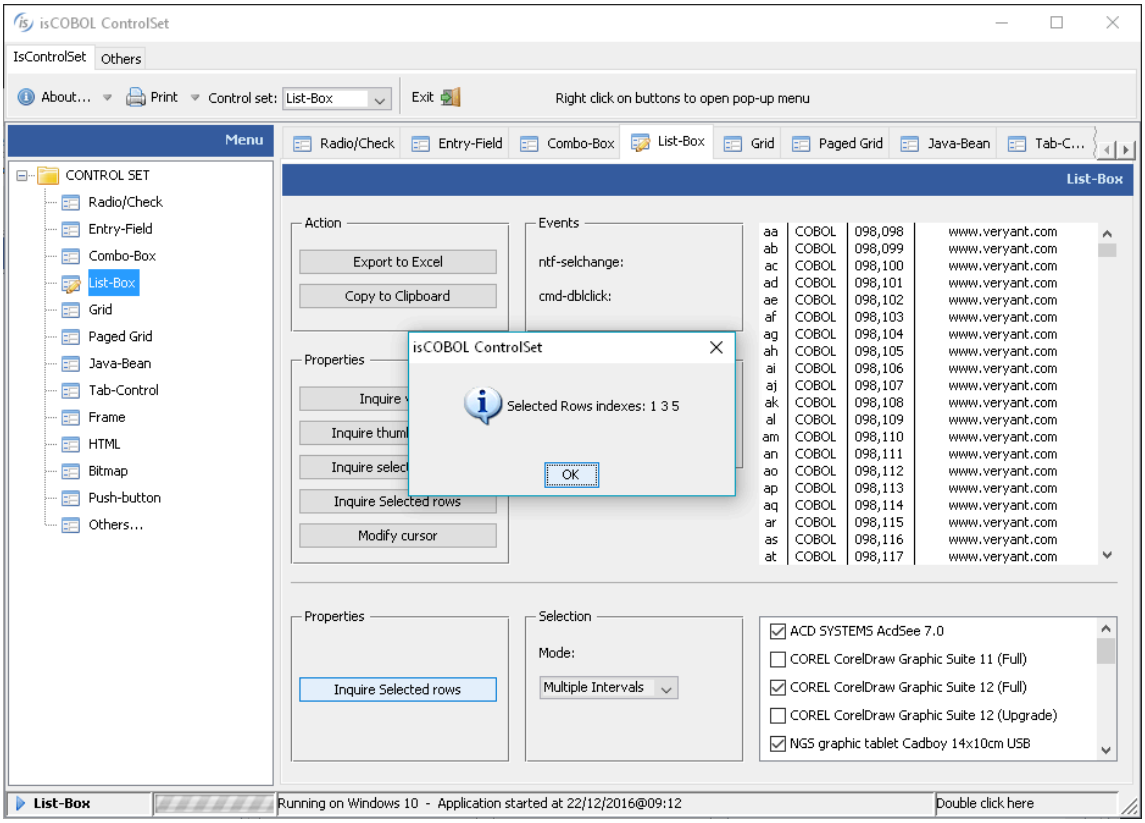
List-box control

List-box now supports easy multi-selection with check-boxes, as shown in Figure 7, *Check-list multiple selection,* or single-selection with radio buttons. Those features can be enabled by setting the new style CHECK-LIST and property SELECTION-MODE to specify if a single or multiple selection is to be used. Selected items can be inquired with the property ROW-SELECTED.

Below is a code sample demonstrating the use of CHECK-LIST style and SELECTION-MODE property of list-box:

```
05 my-list-multiple list-box
     check-list
     selection-mode lssm-multiple-interval-selection
05 my-list-single list-box
     check-list
     selection-mode lssm-single-selection
inquire my-list-single   rows-selected w-row
inquire my-list-multiple rows-selected w-rows
```

Figure 7. Check-list multiple selection



List-box content can now be copied to the clipboard and exported in Microsoft Excel XLS and XLSX formats. The new features can be added automatically or controlled by code.

Using COBOL code, the ACTION property value ACTION-EXPORT will trigger the list-box data export feature. Exported data file name and format can be customized using the EXPORT-FILE-NAME and EXPORT-FILE-FORMAT properties.

Using the ACTION-COPY value of the ACTION property will copy the list-box contents to the clipboard.

Multiple selection modes are now also supported in the list-box control, to allow users to more conveniently select items.

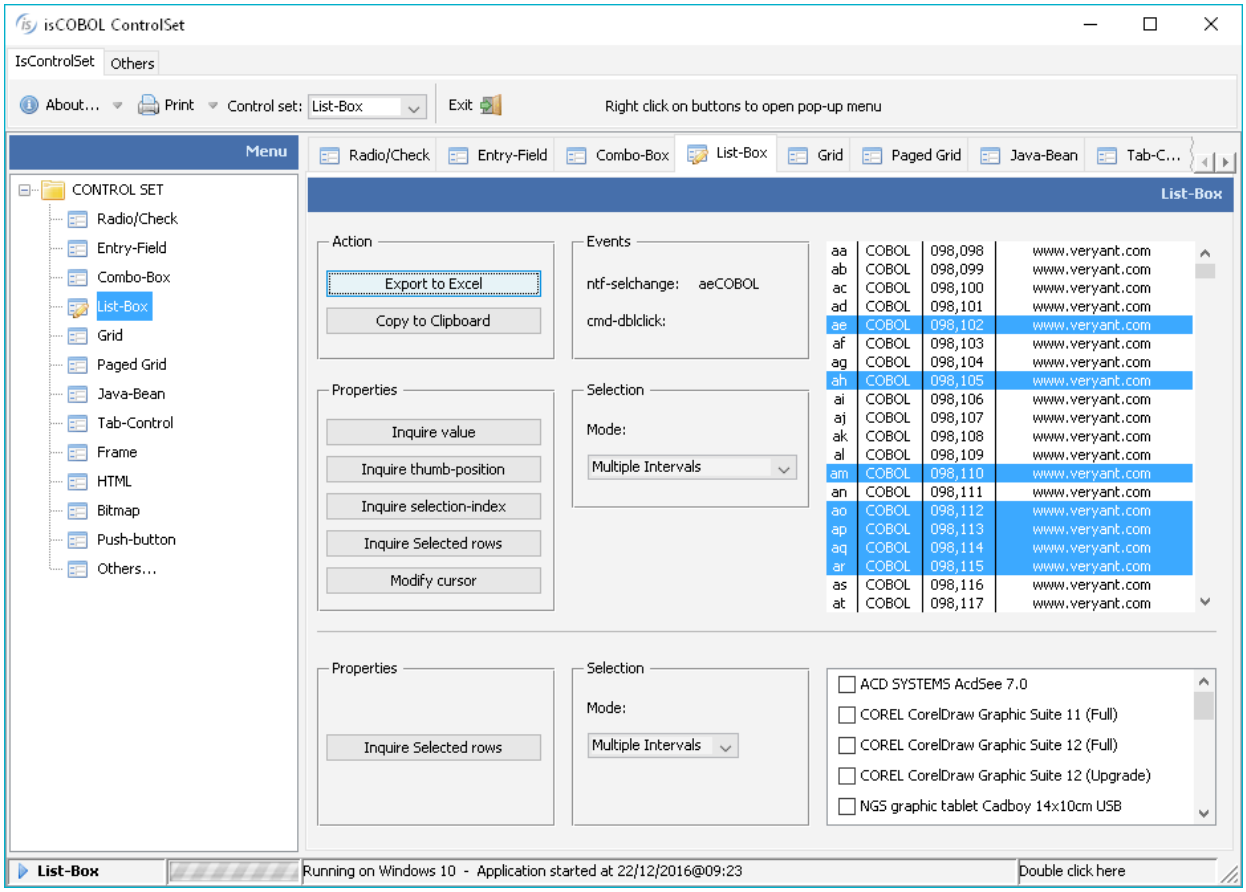
New properties in the LIST-BOX control:

- SELECTION-MODE to set the selection type
- ROWS-SELECTED to retrieve the selected items list

Figure 8, *Export to Excel* shows how the user can access the new list-box export feature. This can be achieved by properly setting the export properties of the list-box, as shown below.

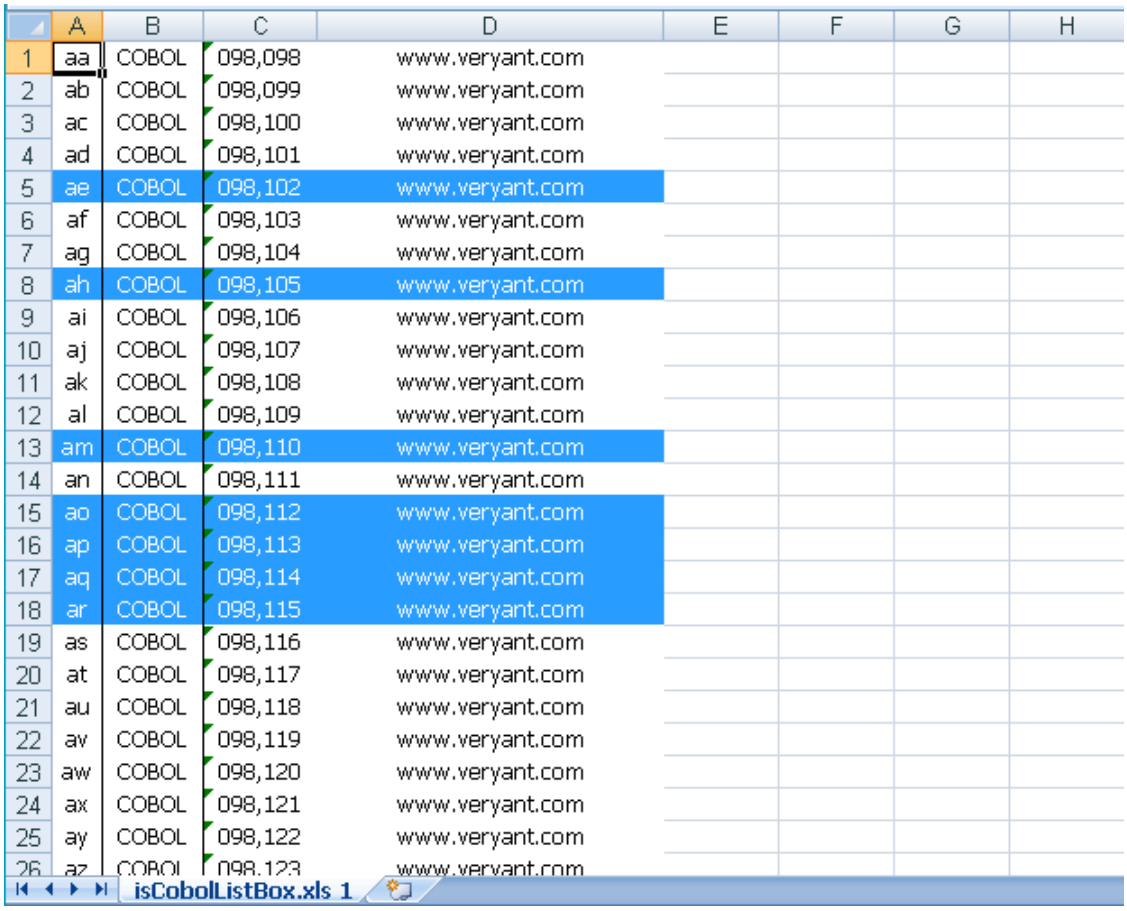
```
05 my-list list-box
     selection-mode lssm-multiple-interval-selection
     export-file-name w-path-filename
     export-file-format "xlsx"

 modify my-list action action-export
```

Figure 8. Export to Excel from List-box



The data exported to Excel will look like Figure 9, *Excel exported file*:

Figure 9. Excel exported file



	A	B	C	D	E	F	G	H
1	aa	COBOL	098,098	www.veryant.com				
2	ab	COBOL	098,099	www.veryant.com				
3	ac	COBOL	098,100	www.veryant.com				
4	ad	COBOL	098,101	www.veryant.com				
5	ae	COBOL	098,102	www.veryant.com				
6	af	COBOL	098,103	www.veryant.com				
7	ag	COBOL	098,104	www.veryant.com				
8	ah	COBOL	098,105	www.veryant.com				
9	ai	COBOL	098,106	www.veryant.com				
10	aj	COBOL	098,107	www.veryant.com				
11	ak	COBOL	098,108	www.veryant.com				
12	al	COBOL	098,109	www.veryant.com				
13	am	COBOL	098,110	www.veryant.com				
14	an	COBOL	098,111	www.veryant.com				
15	ao	COBOL	098,112	www.veryant.com				
16	ap	COBOL	098,113	www.veryant.com				
17	aq	COBOL	098,114	www.veryant.com				
18	ar	COBOL	098,115	www.veryant.com				
19	as	COBOL	098,116	www.veryant.com				
20	at	COBOL	098,117	www.veryant.com				
21	au	COBOL	098,118	www.veryant.com				
22	av	COBOL	098,119	www.veryant.com				
23	aw	COBOL	098,120	www.veryant.com				
24	ax	COBOL	098,121	www.veryant.com				
25	ay	COBOL	098,122	www.veryant.com				
26	az	COBOL	098,123	www.veryant.com				

isCobolListBox.xls 1

Tray icon

In W$MENU a new op-code named WMENUNEW-TRAY has been implemented to manage a multi-platform system tray icon.

The menu is shown in the system tray as an icon where the user can either left or right click or double click. With a right click, the sub-menu (if any) is shown, while with a left and double click, exceptions are sent to the current ACCEPT

When calling `w$menu` with op-code `wmenu-new-tray`, the text passed in the second parameter becomes the hint/tooltip shown when the user hovers the mouse over the tray icon, the third parameter is the exception value generated when the user clicks the icon, and the fourth parameter is the exception value generated when double clicking. The next three parameters are used to select the bitmap to be displayed from the bitmap strip.

Using the calling `w$menu` with op-code `wmenu-add` menu items can be added to the tray icon, as in a normal menu-bar.

The following is an example of the new tray icon usage.

```
call "w$menu" using wmenu-new-tray
              "isCOBOL Tray Icon"
              78-tray-click-exc
              78-tray-double-click-exc
              h-tray-icon 1 16
       giving h-try-menu.

call "W$MENU" using wmenu-add
               h-try-menu
               0 0
               "&About..."
               menu-pb-about
```

Running the code above will display the tray icon as depicted in Figure 10. *Tray icon in Windows 10* and Figure 11. *Tray icon with pop-up menu in Windows 10*

Figure 10. Tray icon in Windows 10

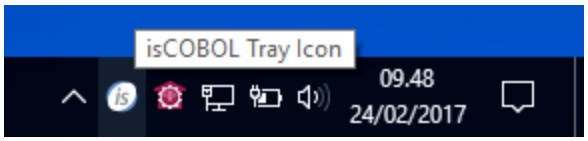
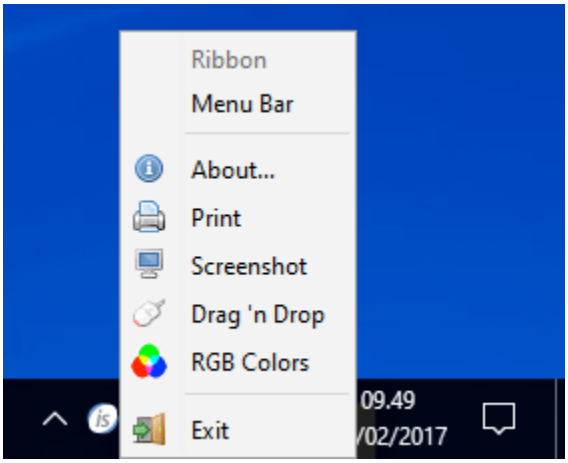


Figure 11. Tray icon with pop-up menu in Windows 10



Library routines

New routines have been implemented to enhance and simplify User Interface handling.

This is the list of new routines:

W$SAVE-IMAGE saves a bitmap-handle to a disk file

W$HINT shows hints programmatically. Hints can also have a different hide-timeout than the default one set from configuration

W$PROGRESSDIALOG easily shows a progress dialog with determinate or indeterminate percentage indicator

W$CENTER_WINDOW centers a window in the screen without needing any calculation from code

Enhancements in existing routines:

The new op-code **WBITMAP-LOAD-FROM-CLIENT** in W$BITMAP routine has been added to manage client-side bitmaps in Thin Client architecture. This is also useful to increase Thin Client performance.

Framework improvements

isCOBOL Evolve 2017 R1 includes a new interface to access C-Tree files and a new utility named IsSort that allow to sort, merge and filter indexed, relative and sequential files.

C-Tree new interface

A new c-treeRTG interface, CtreeJ, is now qualified to be used in heavy multi-thread environments, improving performance of Client/Server architectures of up to 50% on read statements and up to 20% in update statements when compared to other interfaces for c-treeRTG.

CtreeJ fully supports c-treeRTG bound server architecture.

The new interface can be enabled modifying a setting the isCOBOL configuration file:

```
iscobol.file.index=ctreej
```

When using Bound server, also include:

```
iscobol.ctree.bound_server=true
```

Previous values, “fscsc” for connector and “ctree2” for native library, are still supported for backward compatibility.

IsSort utility

The new command line utility IsSort and the new C$SORT routine can be used to sort, merge and filter indexed, relative and sequential files.

The utility is available from the command line or through a COBOL CALL statement

Parameters can be used to drive the new feature:

- SORT/MERGE to specify either a sort or a merge option
- FIELDS to specify the field names of the file to be used
- USE/GIVE to allow to specify the input and output files, of the desired process
- INCLUDE/OMIT inclusion or omission of selected records

When using the command below in a terminal window

```
issort take sort.cmd
```

and the file sort.cmd contains:

```
sort fields (1, 6, ch, d)
  use idxfile org ix
  record f 40
  key (1, 6, p, 7, 15, c, 22, 15, ad)
  give output.txt org ls
  record f 40
  include cond = 37,4,ge,902
```

issort reads the indexed file called idxfile, with record size of 40 bytes, primary key made by two segments and containing an alternate key which allows duplicates.

Records are sorted in descending order on the field with offset=1 and size=6 (the first primary key segment)

Records in which the field at offset 34 with size 4 bytes don't contain a number equal of greater than 902 are ignored, and will not be saved in the output file.

Sorted records are saved to a line sequential file named output.txt

All parameters needed for the sort operations can be specified directly on the command line, as shown below

```
issort sort fields (1, 6, ch, d)  use idxfile org ix record f 40key (1, 6,
p, 7, 15, , 22, 15, ad) give output.txt org ls record f 40 include cond =
37,4,ge,902
```

Sorting can be invoked programmatically using a call statement:

```
call "c$sort" using "sort fields (1, 6, ch, d)  use idxfile org ix record f
40   key (1, 6, p, 7, 15, , 22, 15, ad) give output.txt org ls record f 40
include cond = 37,4,ge,902"
```

isCOBOL Compiler Enhancements

isCOBOL Evolve 2017 R1 includes several changes to the isCOBOL Compiler that improve productivity and simplify migration from other COBOLs.

Compiler optimizations

Recompiling programs with 2017 R1 creates more optimized classes that use less memory and provide faster class-loading times. This optimization is enabled by default, no options required.

An additional compiler option, –oe, has been added to optimize the java code for the EVALUATE statement with string literals. This takes advantage of the Java statement "switch" on Strings, supported by JDK 1.7.

Compiler warning detection

A new compiler option, -whttp, is now available to show Warnings for unsupported statements under isCOBOL EIS html based solution, useful when developing isCOBOL Mobile applications. This helps in migrating existing COBOL programs to web or Mobile Apps.

Enhanced compatibility with other COBOLs

The WAIT LOCK clause in READ statements is now supported by the compiler, and is currently implemented in JIsam and C-tree interfaces, to fully support the Micro Focus COBOL syntax.

A new compiler option, -crlk, has been implemented to emulate the RM-COBOL style lock modes, whose behavior depends on DECLARATIVES for specific files.

A new configuration property,

```
iscobol.ccopy.client_temp_as_base_dir=true
```

has been added, which will use the client's temp folder in C$COPY when copying files in Thin Client architecture. This enhances compatibility with ACUCOBOL-GT.

IsCOBOL Server Improvements

isCOBOL Server can now be configured to start additional JVM processes on the server side when receiving connection requests. Moreover, the administrator Panel has been enhanced.

Thin Client TCP/IP traffic generated on statements such as:

```
display window
inquire line, col, size, lines
call "w$font"
```

has been reduced up to 50% enhancing performance.

Multitasking

This new feature helps when multiple developers need to debug applications running on the same isCOBOL Server.

The new configuration setting, `iscobol.as.multitasking` allows specifying whether separate JVM processes are used for every thin client (value 1) or only the client programs launched in debug mode (value 2).

Java options can now be passed to the new processes by setting the new configuration `iscobol.jvm_options`.

Following is a configuration sample used to configure isCOBOL Server for debugging simultaneously from 2 different Clients:

```
iscobol.as.multitasking=2
```

Using this setting two developers can debug Thin Client applications by only selecting different debug ports:

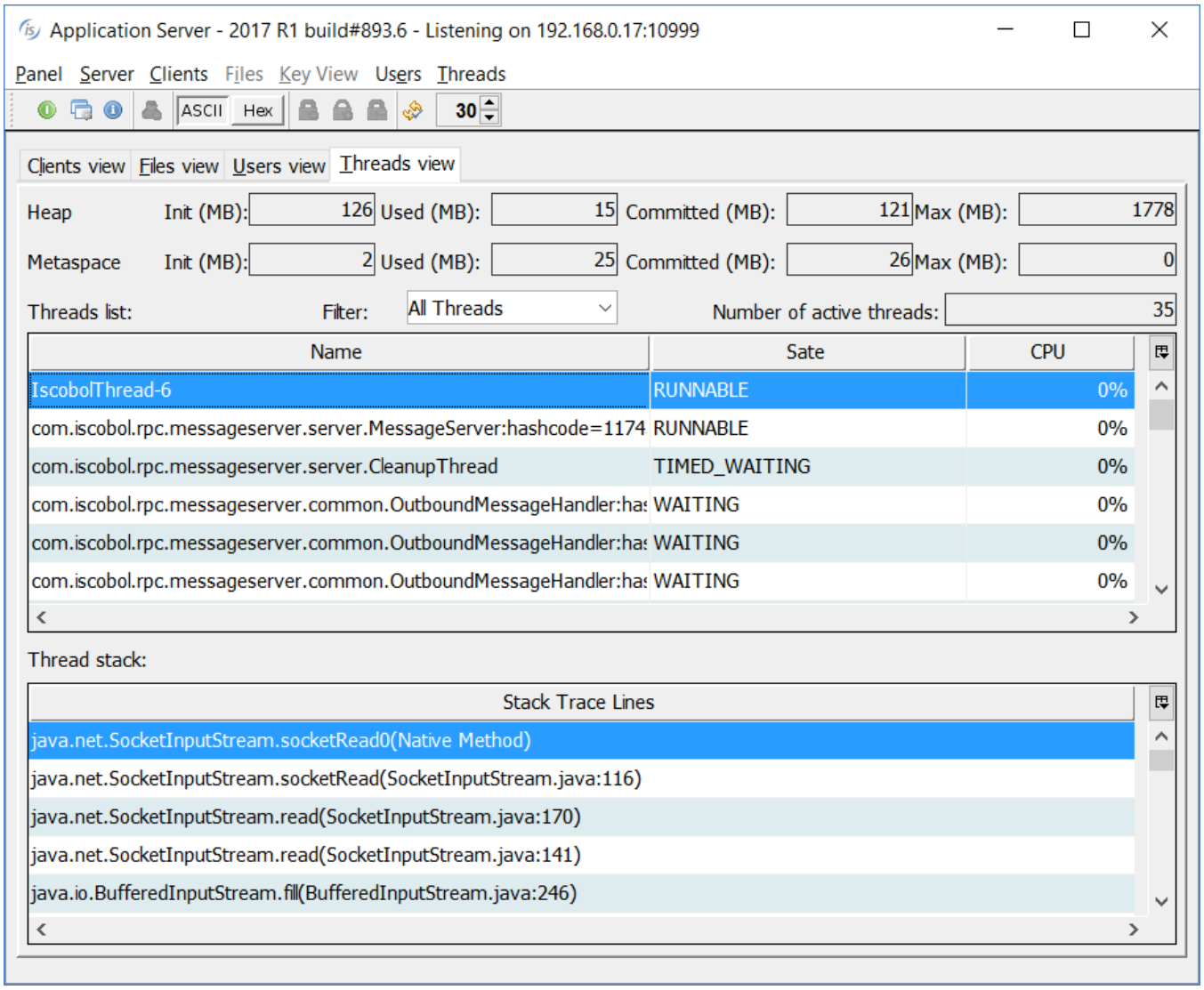
```
iscclient -hostname ipserver -port 10999 -d -debugport 9991 MYPROG
iscclient -hostname ipserver -port 10999 -d -debugport 9992 MYPROG
```

These debugger sessions don't interfere with other Clients running without debug mode, allowing debugging applications on production or test environments, while other clients are running.

Panel improvements

The isCOBOL Server administration Panel has a new “Threads View”, which shows CPU usage of all isCOBOL Server threads, and allows killing them, as depicted in Figure 12.
Threads View

Figure 12. Threads View



The Clients View in the Panel now has the new Stack column, that can now show the list of running threads for each TID, if the application uses multithread programming, and the COBOL stack trace for each thread as shown in Figure 13. *Clients view*, Figure 14. *Single thread call stack* and Figure 15. *Multi thread call stack*

Figure 13. Clients view

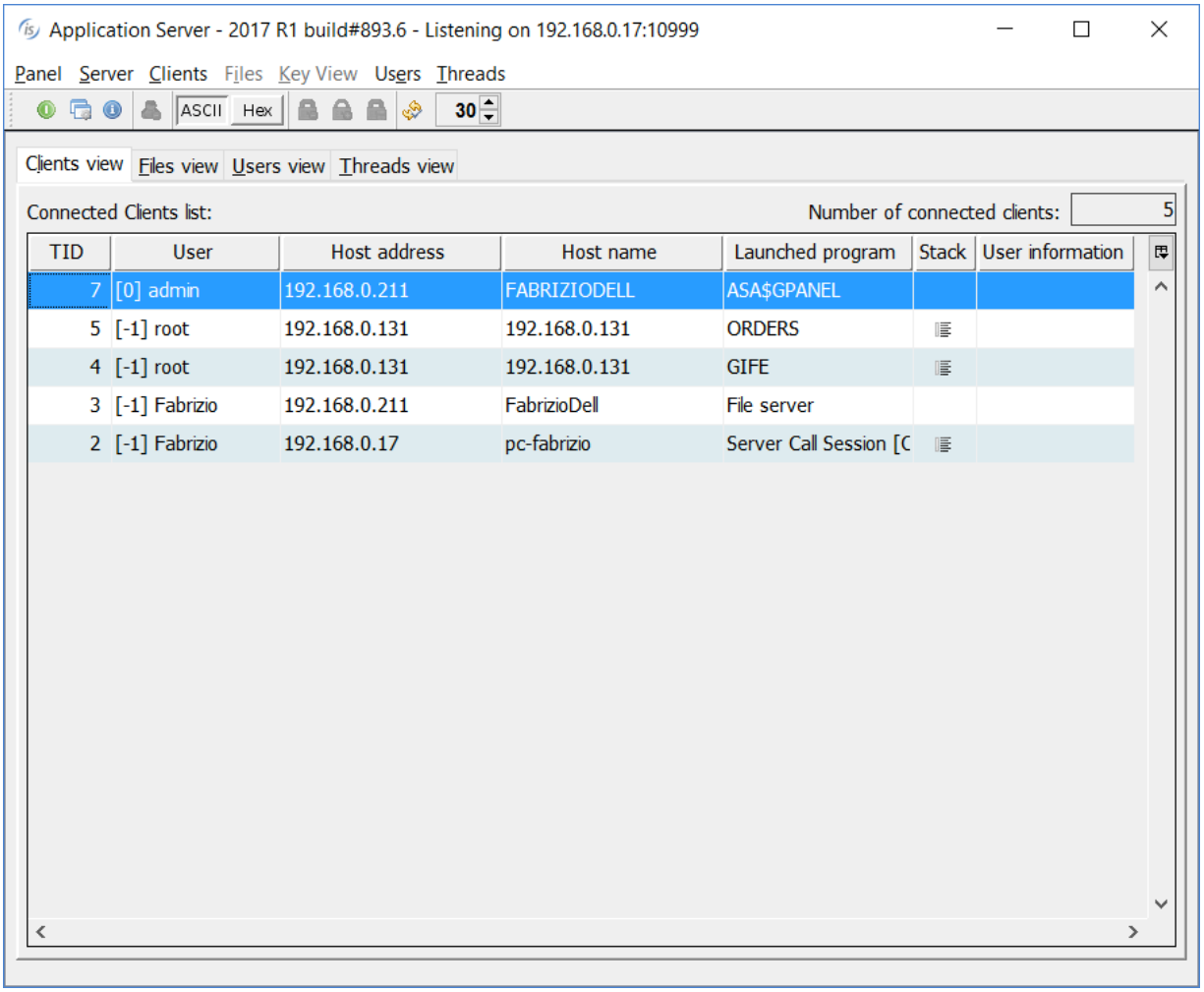


Figure 14. Single thread call stack

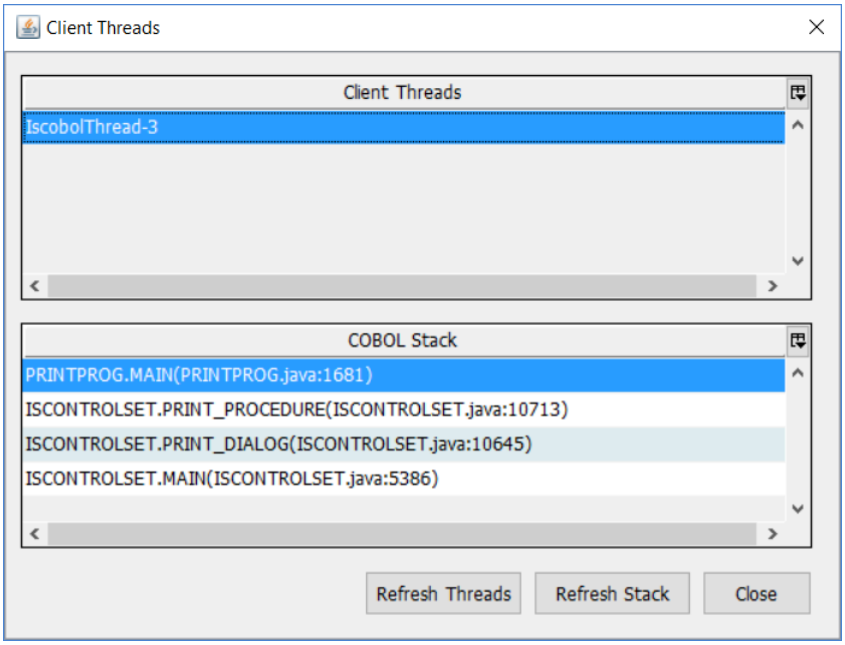
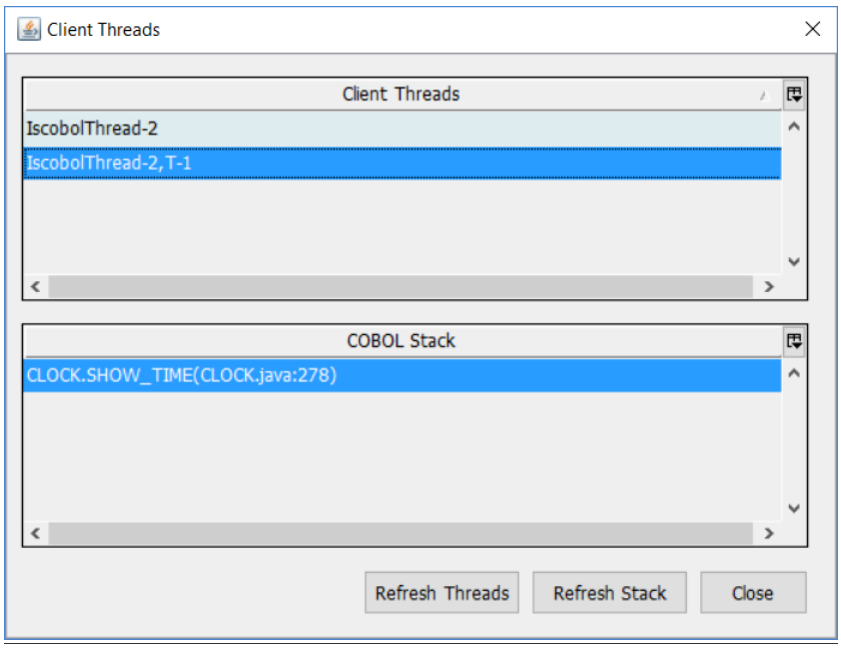


Figure 15. Multi thread call stack



isCOBOL EIS improvements

COBOL Java-Bean client generation

The compiler can now generate clients for web services (REST or SOAP) that can be used in a COBOL or Java context. While generating the service bridge program, the compiler can now also generate a client Bean for easy web service testing, for example is a JavaServer Page (JSP).

For example, if the Service Bridge is used to generate a Rest web service, the bean must be configured as

```
iscobol.compiler.servicebridge.bean=rest
```

while if a SOAP web service was generated, then the configuration should be

```
iscobol.compiler.servicebridge.bean=soap
```

Other configuration options can be set to further customize code generation

```
iscobol.compiler.servicebridge.bean.prefix=prefix (default bean)
iscobol.compiler.servicebridge.bean.url=shttp://myip:8081/myservices
    (default "http://localhost:8080/services")
```

Log http requests and responses

Http requests and responses handled by the HTTPHandler class can now be logged with new configuration options:

`iscobol.soap.log=true` globally enables logging of web service methods

`iscobol.soap.log.`*`methodname`*`=true` to enable or disable logging for the SOAP service with the specified method name, overriding the global setting where needed

`iscobol.soap.log.folder=/path` sets the folder where .log files are generated

Logging can be fine-tuned by globally enabling or disabling logging for every implemented method in the web service, and overriding settings for individual methods.

The new log feature aids in debugging SOAP web services by logging the raw HTTP requests received from clients, including HTTP headers and SOAP XML, before they are parsed by the runtime, and the raw SOAP XML responses sent back to the clients.

Following is a sample of the data logged by the new feature:

```
================================
Request received at 2016-12-354 - 11.14.53.0758
Begin request id:1mj2hvpsysi7wne8lbwev9wb
Request headers:
User-Agent=Java/1.8.0_65
Connection=keep-alive
Host=127.0.0.1:55171
Accept=text/html, image/gif, image/jpeg, *; q=.2, */*; q=.2
Content-Length=1335
Content-Type=application/soap+xml; charset=utf-8
Request body:
Input Request
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tns="http://tempuri.org/SONGS">
  <soapenv:Body>
    <tns:SONGS>
      <tns:lnk_op_code>F</tns:lnk_op_code>
      <tns:lnk_song_data_in>
          …
        </tns:lnk_sd_authors_in>
      </tns:lnk_song_data_in>
    </tns:SONGS>
  </soapenv:Body>
</soapenv:Envelope>

Output Response generated at 2016-12-354 - 11.14.53.0771
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:tns="http://tempuri.org/SONGS">
  <soapenv:Body>
    <tns:SONGSResponse>
      <tns:lnk_song_data_out>
        <tns:lnk_sd_id_out>1</tns:lnk_sd_id_out>
        <tns:lnk_sd_title_out>Let It Be                    </tns:lnk_sd_title_out>
        <tns:lnk_sd_length_out>4:03 </tns:lnk_sd_length_out>
        <tns:lnk_sd_artist_out>Beatles             </tns:lnk_sd_artist_out>
        <tns:lnk_sd_album_out>Let It Be                    </tns:lnk_sd_album_out>
        <tns:lnk_sd_genre_out>Pop            </tns:lnk_sd_genre_out>
        <tns:lnk_sd_label_out>Apple Records                </tns:lnk_sd_label_out>
        <tns:lnk_sd_year_out>1970</tns:lnk_sd_year_out>
        <tns:lnk_sd_authors_out>
          <tns:lnk_sd_author_out>Paul McCartney      </tns:lnk_sd_author_out>
        </tns:lnk_sd_authors_out>
           …
      </tns:lnk_song_data_out>
      <tns:lnk_return_status>
        <tns:lnk_status>OK</tns:lnk_status>
        <tns:lnk_file_status/>
        <tns:lnk_status_message>Operation successful
</tns:lnk_status_message>
      </tns:lnk_return_status>
    </tns:SONGSResponse>
  </soapenv:Body>
</soapenv:Envelope>
```