Unit Testing Results

Multi-Language Support for Wine

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Introduction

The Wine compatibility layer application provides a method to utilize applications built for the Windows® operating system to run on a PC running either the Linux operating system or Mac® OS. Depending upon the feature set within an application, the application may run flawlessly when utilizing it with Wine, it may execute most features but not all, or possibly it fails to load and execute. As the Wine application has evolved, more functionality has been incorporated into the application resulting in more applications executing with most or all of their functionality.

One area of functionality that still does not appear to be available within the release of the Wine application is the capability of identifying and loading resources to support multi-language support as it pertains to retrieving resources an application stores in associated "mui" files. Programs will either load with missing resources such as menus, accelerators, and text, or they may not even successfully load.

To address this issue, experimentation and testing of various coding enhancements were performed to provide at least some rudimentary support for locating, identifying, and loading resources from an associated "mui" file to fill in this functionality gap. After many iterations of coding and testing, a set of code revisions were scaled down and added to a single program file, "loader.c", which is a part of the "kernelbase" library set. Keeping the enhancements contained within one source file member helps in minimizing possible knock-on effects with other code within the library set as well as with other library sets.

With that as background information, following are the parameters and results of the tests applied to this multi-language support enhancement.

System Setup for Testing

The following operating system parameters and Wine parameters were used in conducting these tests:

- Operating System – Linux Mint 19.3
- Wine Version – 5.15
    - Core fonts were installed via winetricks.
    - Windows® Media Player 9 and codecs were installed via winetricks.
    - Windows® theme "VistaLuna" was installed via winereg.

First, the latest version of the "wine-devel" application was installed on the system along with all required support libraries. Then, the required compiler, support libraries, and the source code for Wine were installed onto the system. The "make" command was used to build the initial iteration of the Wine test application suite, the code enhancements were incorporated into file "loader.c", and the Wine application test suite was rebuilt using the "make" command, thus setting up the infrastructure to perform various unit tests.

Unit Test Scenarios

Launch and Run an Application that Utilizes Multi-Language Support

Purpose: Determine effectiveness of the multi-language enhancement for programs that utilize a multi-language resource file.

Application: Chess

Language: en-US

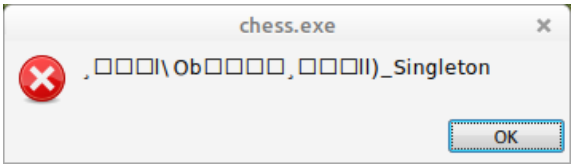
Baseline Test without the Multi-Language Enhancement

Desired Outcome:

- Chess game is launched, is playable, and all resources are available.

Result:

- Program fails to launch.



Test with the Multi-Language Enhancement

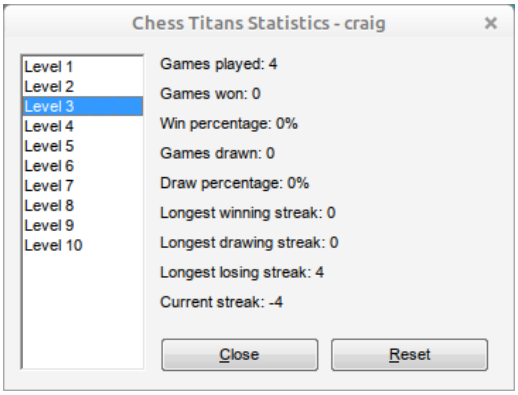
Desired Outcome:

- Chess game is launched, is playable, and all resources are available.

Result:

- The game launches and all resources appear to be available.

- Dialog boxes appear when called containing full text.



- Accelerators (such as Ctrl-Z for undo) appear to work.

Side Effects:

- The initial loading of the executable program seems to take some time, but since the application did not load under the base version, it is impossible to tell the magnitude of time increase this enhancement might have had in initial load of the application. Therefore, another similar game application will be tested as well.

Conclusion:

- Launching the game application with the multi-language enhancement does appear to provide the application with the ability to successfully launch and retrieve all of its resources.

Application: Mahjong Titans

Language: en-US

Baseline Test without the Multi-Language Enhancement

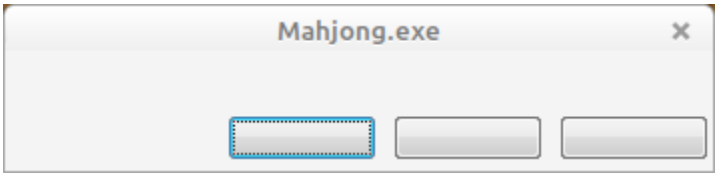
Desired Outcome:

- Mahjong game is launched, is playable, and all resources are available.

Result:

- The application does successfully launch and the game is displayed.
- No menu bar is displayed indicating an issue with the retrieval of menu resources.
- Text is garbled indicating some issue with the retrieval of text resources.

- A game layout could be selected and the game could be played.
- No accelerators appeared to work indicating and issue with resource retrieval.
- No text appeared in the dialog boxes.



- Since no menu was available, the only way to exit the program was to close the window.

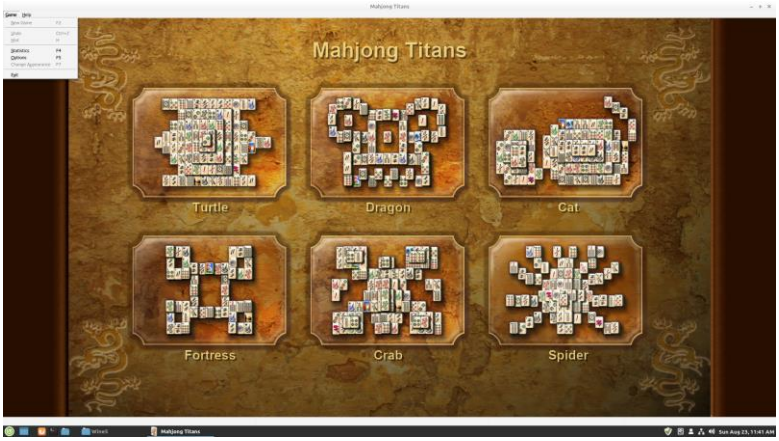
Test with the Multi-Language Enhancement

Desired Outcome:

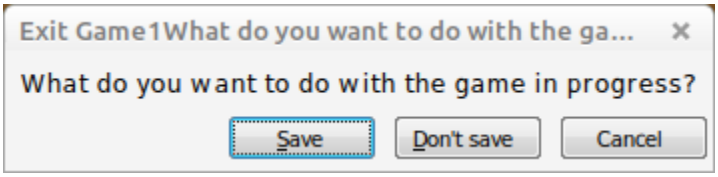
- Mahjong game is launched, is playable, and all resources are available.

Result:

- The application does launch and the game is displayed.
- The menu bar is displayed and menu options are available.
- Text is not garbled and is displayed correctly.



- Once a game layout is selected, tests of the accelerators (such as Ctrl-Z) all appear to work.
- Dialog boxes contain text.



- The game can be exited either by selecting the appropriate menu option or by closing the window.

Side Effects:

- The initial loading of the executable program seems to take a second or two longer to load than it did when launched from the base version of Wine. But once the initial load was complete, the game performance did not seem to be affected.

Conclusion:

- Launching the game application with the multi-language enhancement does appear to provide the application with the ability to retrieve all of its resources.

Launch and Run an Application that Does Not Utilize Multi-Language Support

Purpose: Verify there are no knock-on effects of the enhancement on applications that do not require multi-language support.

Application: Notepad++

Language: N/A

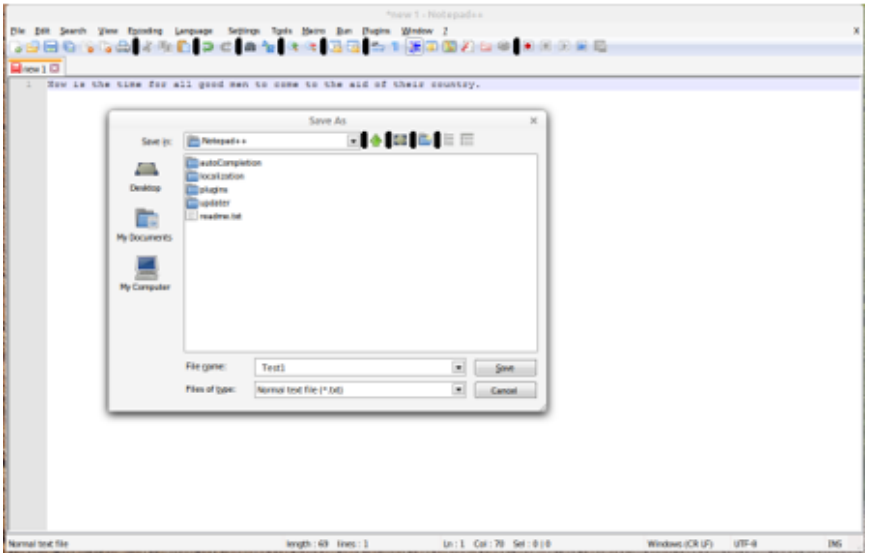
Baseline Test without the Multi-Language Enhancement

Desired Outcome:

- Application is launched and its responsiveness is observed.

Result:

- The application loaded within a few seconds.
- All of the menu options appeared to work.
- Typing text responsiveness was good.
- Bringing up the file dialog for saving the file had good response time.



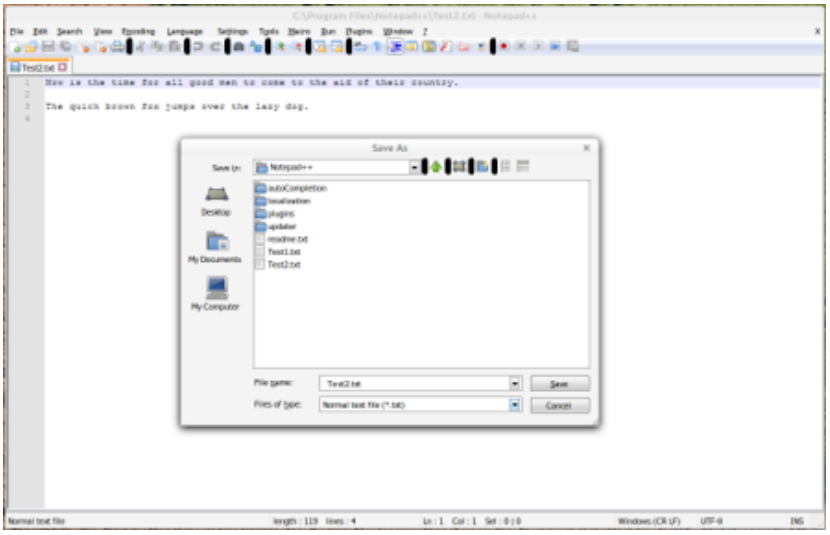
Test with the Multi-Language Enhancement

Desired Outcome:

- Notepad++ loads and behaves in the same manner as it did when utilizing the base version of the Wine application with no side effects.

Result:

- The application is loaded within a few seconds
- All of the menu options appear to work.
- Typing text responsiveness is good.
- Bringing up the file dialog for saving had good response time was good.



- There appeared to be no additional time lag in executing this application with the multi-language enhancement and there did not appear to be any side effects.

Conclusion:

- Launching this application with the multi-language support enhancement does not appear to negatively affect the responsiveness of functionality of applications that have no multi-language resources.

Launch and Run a Legacy Windows® Application

Purpose: Verify there are no knock-on effects of the enhancement on applications that predate multi-language support.

Application: Solitaire

Language: N/A

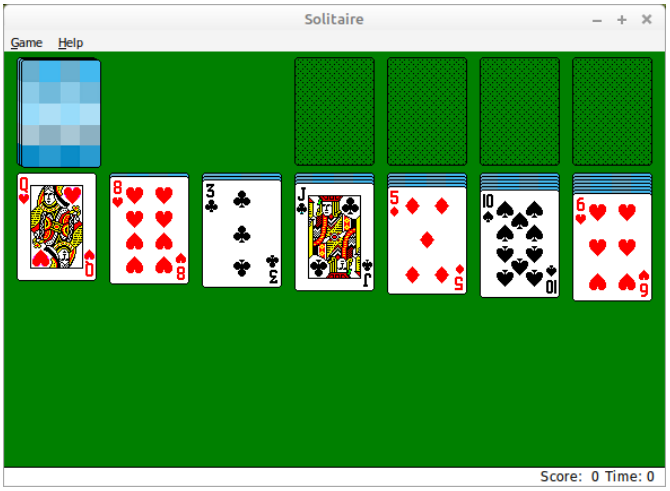
Baseline Test without the Multi-Language Enhancement

Desired Outcome:

- Application is launched and its responsiveness is observed.

Result:

- The application loaded within a few seconds.
- All of the menu options appeared to work.
- Game play responsiveness was good.



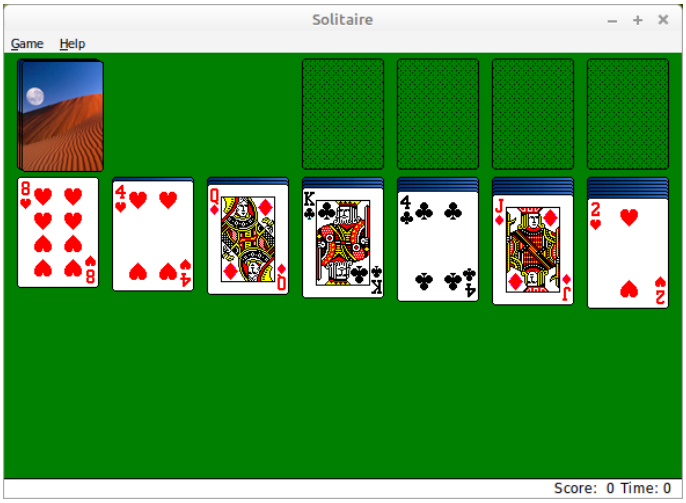
Test with the Multi-Language Enhancement

Desired Outcome:

- The solitaire game loads and behaves in the same manner as it did when utilizing the base version of the Wine application with no side effects.

Result:

- The application is loaded within a few seconds
- All of the menu options appear to work.
- Typing text responsiveness is good.



- There appeared to be no additional time lag in executing this application with the multi-language enhancement and there did not appear to be any side effects.

Conclusion:

- Launching this application with the multi-language support enhancement does not appear to negatively affect the responsiveness of functionality of applications that were built prior to the use of language resources.

Summary

In observing the results of the unit tests, the following conclusions were made:

- The enhancement appeared to be able to find and load resources from a multi-language support file associated with the executable file launched by the Wine application.
- For applications that relied on resources from a multi-language resource file, initial loading did appear to take longer than occurred when the unmodified version of the Wine application was used; however, once the initial loading was complete, the responsiveness of the application appeared to be nominal.
- Aside from the apparent additional loading time, there did not appear to be any other side effects in the applications that relied on multi-language support nor in the applications that did not rely on multi-language support.