Porting a large scale enterprise application from Tcl/Tk 8.4 to 8.5

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Problem description

- Challenges involved in porting a large and diverse code base.
    - ❖ Tcl/Tk
        - ❑ External packages like BWidget, *[incr Tk]*, and others.
        - ❑ Internal packages like Mtiwidgets.
        - ❑ Change in behaviour of core *Tcl/Tk* as compared to previous release i.e. 8.4.

    - ❖ C/C++
        - ❑ Change in interface of *Tcl* APIs.

    - ❖ Custom built of *Tk*
        - ❑ TIP #125, converting between frame and toplevel windows using custom extension to *wm* (toplevel).

Configuration details

- *Tcl/Tk* version
  - ❖ 8.5.8 standard distribution.

- Operating system
  - ❖ Redhat Enterprise Linux 4 update 8.

- Compiler
  - ❖ Application is compiled with GCC 4.4.3.

Core Tcl/Tk changes

- ## tk/library/button.tcl.
  - ❖ Issue:
    - ❑ Application uses *check button* and *radio button*, and global variable linked to the buttons are specified using *itcl::scope*. This resulted in exception at runtime with *Tcl* 8.5.
  - ❖ Solution:
    - ❑ Relevant bug # 87409. This fix uses *uplevel* set instead of set ::to work with *itcl*.

- ## *[tk_getOpenFile]* change.
  - ❖ Issue:
    - ❑ With *Tcl* 8.4 multiple file and directory selection using ctrl throws an exception.
  - ❖ Solution:
    - ❑ Fixed in *Tcl/Tk* 8.5 and requires no changes.

Core Tcl/Tk changes continued …

■ Correct *[list]* - Quoting of the '#' Character

❖ Issue:
  ❏ Application dumps tree contents during testing to check for regressions if any. Starting with *Tcl* 8.5, name of tree nodes starting with '#' are quoted by default. This bug in [list]-quoting is present in all released versions of *Tcl* since and including *Tcl* 8.4 and has been fixed in 8.5. *[list]* does not quote the leading '#' in a manner to make the list safe for passing to *[eval]*. The Tcl parser sees the unquoted '#' as the start of a comment.

❖ Solution:
  ❏ Required update to gold files in regression.

Core Tcl/Tk changes continued ...

- *[info level]* change.
  - ❖ Issue:
    - ❑ Application calls *[info level]* with level argument as -1 in order to verify that the *cd* command has been called from within *tk::dialog::file*. This is being done to prevent user from calling *cd* in certain scenarios.

  - ❖ Solution:
    - ❑ Level argument passed to *[info level]* should be -2 instead of -1.

- *[pwd]* change.
  - ❖ Issue:
    - ❑ If a present working directory is deleted, a call to *pwd* no longer throws an exception.

  - ❖ Solution:
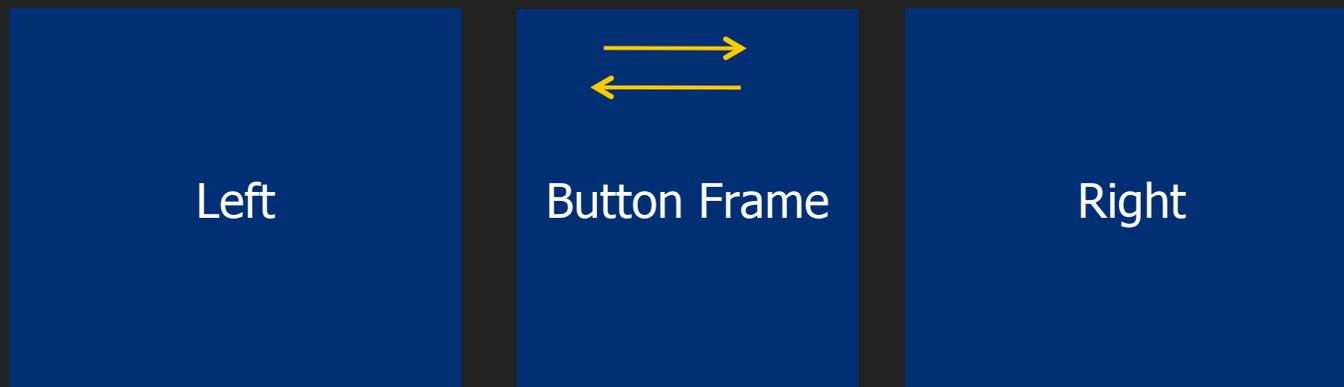   - ❑ Add check for empty string on return value of *pwd*.

Core Tcl/Tk changes continued ...

■ Incorrect gridding/packing of elements.

❖ Issue:

❑ This relates to incorrect display in Tcl/Tk 8.5 as compared to 8.4. For example following code snippet would display the button frame correctly in 8.4 but not in 8.5, where button_frame contains add and remove buttons. A similar issue exists with *iwidgets::disjointlistbox.*

pack $left $button_frame $right –expand yes –fill both –side left -padx 5 –pady 5

Left	Button Frame	Right

Core Tcl/Tk changes continued …

❖ Solution:
❑ Above mentioned code had to be replaced with following.

pack $left –expand yes –fill both –side left –padx 5 –pady 5
pack $button_frame –side left –padx 5 –pady 5
pack $right –expand yes –fill both –side left –padx 5 –pady 5

■ Change in API *TclInitSubSystems*.

❖ Issue:
❑ argv0 has been done away with for TclInitSubSystems. Compiler error notifies the user about this.
❖ Solution:
❑ Remove the NULL argument being passed to the API.
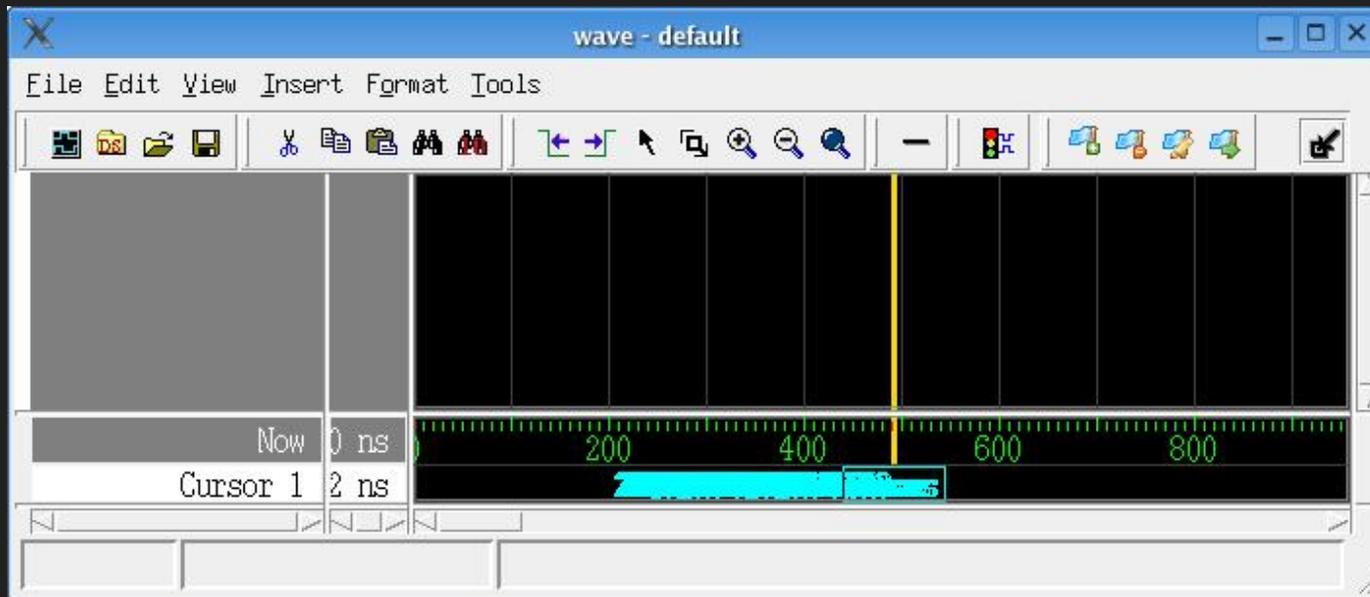
Core Tcl/Tk changes continued …

- **[TIP 125]:** *wm manage* and *wm forget*

  - ❖ Issue:
    - ❑ Application allows docking and undocking of child windows. This was implemented in *Tcl/Tk* 8.4 using custom patch for [*wm toplevel*]. However, this TIP was incorporated into standard distribution with new *wm* subcommands *manage* and *forget*.

  - ❖ Solution:
    - ❑ A procedure wm_toplevel was defined to handle all calls to [*wm toplevel*] through *wm manage* and *wm forget*.

Core Tcl/Tk changes continued ...

- Crash in *Tk* while trying to dock/undock a window repeatedly.

  - ❖ Issue:
    - ❑ Repeated docking and undocking of child windows (achieved by *wm manage* and *wm forget*) would result in application crash. This was due to change in the way "*-menu*" option was configured. These child windows were derived from *itk::Archetype* and due to changes to "*-menu*" option in [*incr Tk*] 3.4, "*-menu*" was configured after first undock operation. This resulted in abnormal termination during docking process.

  - ❖ Solution:
    - ❑ Configure "*-menu*" option to {} during all docking operations and configure it back to correct menu during undocking.

Core Tcl/Tk changes continued …

- A visible tail.

  - Issue:
    - Application uses Mtiwidgets and dragging the cursor leaves a visible trail that goes off as soon as user completes the drag operation.

[*incr Tcl/Tk*] changes

- Change in availability of –menu option.

  - ❖ Issue:
    - ❑ [*incr Tk*] has three base classes that reside in the *itk* namespace namely *itk::Archetype* , *itk::Widget* and *itk::Toplevel* . with [*incr Tk*] 3.4 this option is now defined only for toplevel windows i.e. *itk::Toplevel.*

```
              ┌──────────────────┐
              │     Archetype    │
              └──────────────────┘
                 ↑            ↑
      ┌──────────────┐   ┌──────────────┐
      │    Widget    │   │   Toplevel   │
      └──────────────┘   └──────────────┘
```

  - ❖ Solution:
    - ❑ Application uses custom widget Mtiwidgets and required update to accommodate this change.

Performance

- Penalty in a particular scenario.

  - ❖ Issue:
    - ❑ Moving to newer release of *Tcl/Tk* 8.5 has caused some unexpected regressions in terms of performance. In a particular computation intensive task (on *C/C++* side) it was observed that the performance penalty has been as high as 30%. The function in question is pure *C/C++* implementation.

  - ❖ Solution:
    - ❑ Currently we are trying to profile the application in order to narrow down the exact cause of the problem. We have tried to build the application by linking it to single threaded version of *Tcl/Tk* libraries. However, this hasn't yielded desired results.

Thank you.