RiverWare SCT: Support for Open Slot Panels Development Analysis

Edit: 12-3-2007, Phil Weinstein, CADSWES

This document outlines a general high level design and major development tasks for displaying Non-Series Slots (including Table Slots, Periodic Slots and Scalar Slots) within an SCT window.

The strength of the SCT is its ability to display and edit, simultaneously in a single window, **an arbitrary user-defined list of Slots.** Currently, the SCT supports only Series and Table Series Slots and Slot Columns. Even though the SCT's tabular display can accommodate only Slots sharing the same timestep dimension, there would be value in also displaying Non-Series Slots within the SCT window.

The SCT will be enhanced to support **two or three independent vertical panels** -- arranged horizontally -- each displaying one of the following. *(See also the class diagram later in this document).*

1. **SCT Table Panel** -- the current SCT row header and data tables.
2. **Slot List Panel** -- to manage the list of Slots in the SCT, and to select a Slot to be shown in an Open Slot Panel. This panel will also support display and editing of **Scalar Slots.**
3. **Open Slot Panel** -- for a single Slot of various types, including Non-Series Slot Types.

A common selection status bar will be shown across the bottom of the entire SCT (i.e. spanning all SCT Panels).

Also, the SCT will be enhanced to support **user defined Tabs.** Each Tab will have the following properties:

1. User-supplied Tab Title text.
2. Specifications for Two or Three SCT Panels. For Open Slot Panels, a particular Slot will be identified.
3. "Splitter" positions between the panels.

The **Open Slot Panel** will show the contents of the standard Open Slot Dialogs (currently implemented by the SlotQtDlg and SlotQDlgTable classes). The implementation of those classes will be adapted such that the widgets can be shown within either an **SCT Panel** or in an **Open Slot Dialog.** It will be possible to **"Detach"** Open Slot Panels as Open Slot Dialogs.

Slot types supported by C++ GUI classes other than those of the standard Open Slot dialogs can be added to the SCT's Slot List, but will not be shown within the SCT window. Rather, opening such Slots from an SCT will show their independent Open Slot dialogs. This will apply to:

- Statistical Slots (class StatTableSlotDlg)
- List Slots (class ListSlotDlg)
- Expression Slots (class RplExprSlotDlg)

Currently the Open **Periodic Slot** dialog is implemented with a distinct C++ class (PeriodicSlotEdit), but this project will involve re-implementing that as an application of the SlotQPanel and SlotQDlgTable classes. If it becomes important to show Statistical Slots, List Slots or Expression Slots within an Open Slot Panel, then Open Slot Panel subclasses will have to be developed from those classes (as will be done for SlotQtDlg).

The following sections describe the various high-level development tasks required for this functionality.

1. SctPanel abstract base class and the SctTablePanel Class
2. OpenSlotPanel & SlotQPanel classes / Reorganization of SlotQtDlg
3. SlotListPanel class
4. Open Periodic Slot Dialog as an application of SlotQPanel / SlotQDlgTable
5. SCT Panel Layout Control Design and Implementation
6. Tab Management
7. Integrated Selection Architecture for Copy/Paste, edit functions, selection status

1.0 SctPanel abstract base class and the SctTablePanel Class

An **SctPanel abstract class** will be defined as a QFrame widget with methods for management by an SCT.

The current SCT tables (there are two: row header table, and data table, contained in an **SctView**) will be encapsulated in a concrete **SctTablePanel,** a subclass of SctPanel. The **SctDialog** class will instantiate a single SctTableClass. There will not be any functional or graphical differences introduced with this work.

SctPanel will be the base class of:

1. SctTablePanel (described here)
2. OpenSlotPanel (section 2.0)
3. SlotListPanel (section 3.0)

2.0 OpenSlotPanel & SlotQPanel classes / Reorganization of SlotQtDlg.

OpenSlotPanel is a new lightweight abstract subclass of **SctPanel.** It will initially have a single concrete subclass: **SlotQPanel** composed of the widgets that make up the body of the standard Open Slot Dialog (for SeriesSlots, TableSlots, and their subclasses, currently with the exception of Periodic Slots). Much of the implementation of SlotQtDlg -- all but the menu bar and dialog box management -- will be moved to SlotQPanel. SlotQPanel will register for and handle all callbacks currently handled by SlotQtDlg.

For this development task, simple controls for showing any of the SCT's Slots within an OpenSlotPanel (actually, a SlotQPanel) will be implemented. This will be limited to those necessary for the basic integration of a SlotQPanel with the SCT.

3.0 SlotListPanel class

Management of the **list of Slots within an SCT** will be encapsulated in a new SctPanel subclass implementing a QListView of Slots. **SlotListPanel** will support more convenient reordering of an SCT's Slots (including Up and Down arrow buttons shifting all selected Slot Items within the Slot List). All types of Slots will be supported. This panel will have GUI controls to show only **Series Slots** or **Non-Series Slots**, or only **ScalarSlots.** When only ScalarSlots are shown, **"Value" and "Unit" columns** will appear, and **incell editing of the values** will be supported.

For this development task, simple controls for showing a SlotListPanel within the SCT will be implemented. This will be limited to those necessary for the basic integration of a SlotListPanel with the SCT.

Probably, no additional persistence provisions will be needed for the Slot List. (The SCT Configuration is primarily a list of Slot Names). However existing mechanisms will have to be adapted to accommodate Non-Series Slots. For example, when building the SctTablePanel, only those Slots having a time series will be used.

4.0 Open Periodic Slot Dialog as an application of SlotQPanel / SlotQDlgTable

The current Open Periodic Slot Dialog (class PeriodicSlotEdit) was one of the first Qt dialogs implemented in RiverWare. It lacks many features on the standard Open Slot dialogs (e.g. for Series or Table Slots), e.g. multiple cell editing and copy/paste. Since Periodic Slot is a Table Slot subclass, and since Numeric Dimensions (numeric column maps) are now supported for Table Slots in general, implementation of the Open Periodic Slot Dialog as an application of the SlotQPanel / SlotQDlgTable classes will not be difficult. Development will be limited to custom row header text, hooks to minor support dialogs, and a few basic widgets.

5.0 SCT Panel Layout Control Design and Implementation

Exactly how the user will control the display of the various SctPanels has not yet been defined. Some time will be needed to design and implement widget controls for SCT Panel Layout.

- Probably, to display a new Slot in an Open Slot Panel, initially the Slot List Panel will be shown. When the user selects a Slot Item in that panel, the panel will be replaced with an Open Slot Panel for the selected Slot.
- The single SCT Toolbar may be split into two rows of controls to accommodate additional controls for managing SCT Panels.

These are just two of the aspects of SCT Panel Layout Control which need to be addressed.

6.0 Tab Management

Once the user has laid out the SCT Panels, that arrangement and the Slot selected for each Open Slot Panel can be saved as a “Tab”. It will be reasonable for an SCT to handle about eight or so Tabs, depending on the length of the text labels assigned by the user to the Tabs. The properties associated with each tab are listed in the introduction.

SCT persistence will need to be enhanced to accommodate Tabs. This involves Flex/Bison parsing.

7.0 Integrated Selection Architecture for Copy/Paste, edit functions, selection status

The multiple-cell selections (e.g. for copy and paste, and value editing operations) in the SCT and in the standard Open Slot Dialog (in SlotQDlgTable) -- while both based on the QTable selection mechanism -- are incompatible. (They evolved from distinct mechanisms). These two mechanisms should be reconciled so that values can be copied and pasted between Open Slot Frames and the SCT Table Frame. This will also ease the implementation of a common selection status bar for selections in these two types of panels.

RiverWare SCT:
Support for Open Slot Panels
preliminary class design, 12-3-2007, pw cadswes
QFrame
SctPanel
SctTablePanel
SctView (4)
SlotQDlgTable
OpenSlotPanel
future slot panels
SlotQPanel
SlotListPanel
SctDialog [SCT]
SlotQtDlg Standard Open Slot Dialog
Prior class design
SctView (4)
SctDialog [SCT]
SlotQDlgTable
SlotQtDlg Standard Open Slot Dialog