Containing COTS via Intelligent Software Wrappers

Jeffrey Voas
Chief Scientist
21515 Ridgetop Circle, Suite 250
Sterling, VA 20166
(703) 404-9293
jmvoas@rstcorp.com
http://www.rstcorp.com

I see bad things in your software
Wrapping

- **Goal:** Disallow components from exhibiting certain functionality by placing a software “net” around a component limiting what it can do

  - Two sub-goals: (1) Removing functionality, (2) Recovery
  
  - Two approaches: (1) Input wrapper, (2) Output wrapper

  - **Note 1:** Changes the interface to the system

  - **Note 2:** Complex and error prone, but probably the most plausible alternative
COTS Component Wrapping

WITHOUT WRAPPING
1. COTS inputs
2. COTS outputs

WITH WRAPPING
3. SAFE inputs
4. SAFE outputs
Wrapping Example: Monitoring Inputs

WITHOUT WRAPPING
1. COTS inputs
2. COTS outputs

WITH WRAPPING
3. SAFE inputs
Wrapping Example: Monitoring Outputs

**WITHOUT WRAPPING**
1. COTS inputs
2. COTS outputs

**WITH WRAPPING**
3. SAFE outputs
But How Do You Know What Kind of a Wrapper to Build?
Fault-Injection--Based Wrapper

Applying fault injection methods to the states at the interfaces to the component to determine what states to prevent from entering/exiting the component
.... But a Problem

Test the Wrapper !!
The *Infamous* Excel Easter Egg

Incidentally, you can have fun with a bit of software bloat if you have Excel 97. Open a new blank work sheet, press F5, and type X97:L97 in the "Reference" box, then click OK. Tab once. (You should end up in cell M97.) Press Ctrl+Shift while clicking once on the "chart wizard" icon (at the top with the blue-yellow-red bar chart) and you are now in the Excel Flight Simulator mode. Steer with the mouse, use the buttons to zoom in and out, and look for the monolith with the programmer credits. You can exit the screen by pressing Ctrl+Shift+Esc (or hit escape to quit, but then you must restart Excel).

[RichardFritzson<fritzson@cs.umbc.edu>, 16 May98.]
... And Other Problems With Wrappers

*You are treating symptoms, not problem(s)!!*

*Wrappers can be complex and defective themselves*