OPEN COMPONENTS FOR EMBEDDED REAL-TIME APPLICATIONS

Demo FT: Design FT Application with FT Builder (WP06)

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Goals:

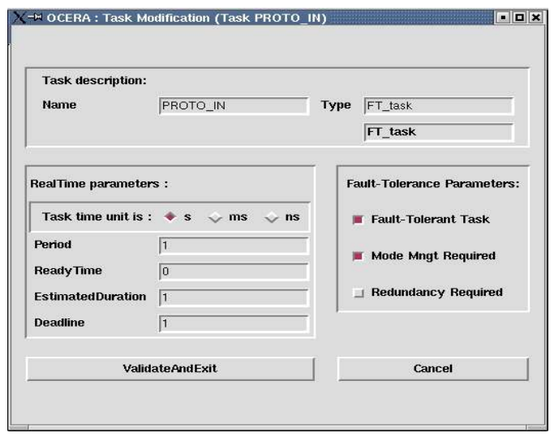
This demo shows the utilisation of the FT Builder component/tool which builds and generates a FT application model. The proposed application is a fault tolerant simulated robotic application named **fthaptic**.
The goal is to show the interest of a high level modelisation of a FT application with declaration and generation facilities .

Tested components:

- FT Builder (WP06)

Description:

The FT application **fthaptic** is a simulation of the real haptic application (WP9) that integrates fault tolerance mechanisms.
The application developer has to design and build the **FT application model**.
The **FT Builder** component is a design/build tool for FT application.
The current implementation provides support for Degraded Mode Management.
It is written in TCL-TK (8.3).



1) The FT Builder allows to enter the application model entities (ft_tasks, application modes, application modes transitions).

ft-tasks :

- the ft-task parameters: identifier, period (s/ms/ns), ready-time, duration, deadline .
  PROTO_IN , 1 , 0 , 1 , 1
  SERVO , 1 , 0 , 1 , 1

ft-task behaviors :

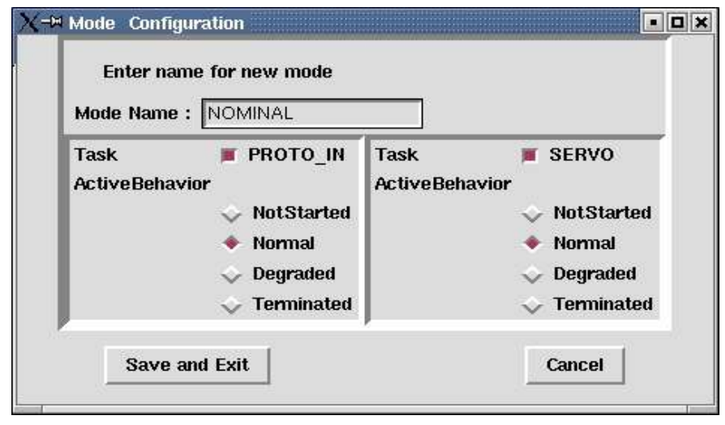
- the ft-task behaviors: not-started, normal, degraded, terminated
  example : SERVO , NORMAL

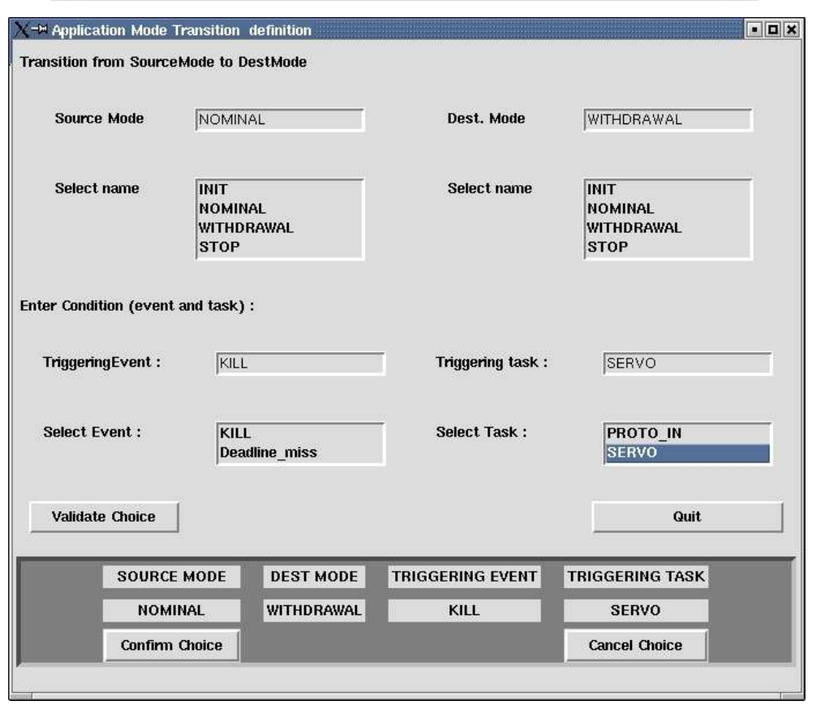
application modes :

- the application mode parameters: identifier, set of ft-tasks, related ft-task behaviors
  example : INIT, NOMINAL, WITHDRAWAL, STOP

application modes transitions :

- the application modes transitions parameters:
  src mode, dest mode, triggering event, triggering task
  (possible triggering events are: KILL, deadline-miss)
  examples : NOMINAL to WITHDRAWAL, WITHDRAWAL to STOP





2) The FT Builder generates the FT application model under the form of include and source code files, which are then integrated in application developer code and used at run-time by FT components .

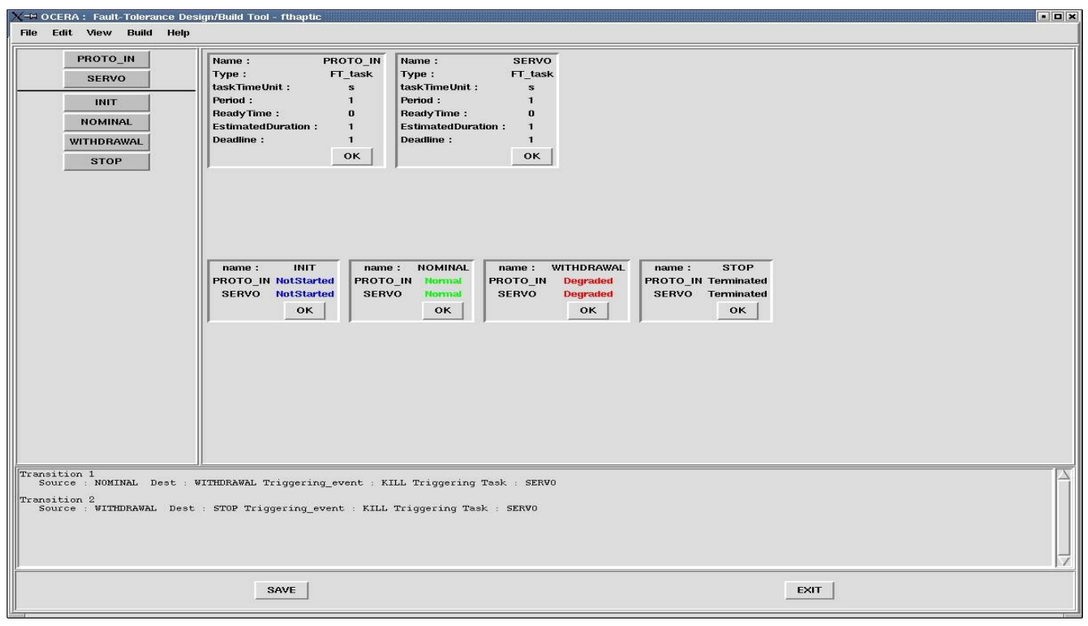
Demo phases

Phase 1

- Design the FT-tasks and ft-tasks behaviors
- Design the application modes
- Design the application modes transitions

Phase 2

- Build/Generate the application model



Conclusions and results:

The design of the FT application by a dedicated design/build tool FT Builder allows an easy and appropriate FT modelisation of the global real-time/embedded application. The generating facility of the FT Builder tool allows to generate the application model and avoid manual manipulations and errors. Errors with manual entering on application model have demonstrated the interest of such declarative and generating approach.