Critical System Case Study

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

In brief

- **plugin.odf-inp:PLUGINS_ODF_COURSE_NBHOURS_TXT:** 10
- **Code:** NEGC10E

Presentation

Objectives

The objectives of this project / case study is to implement several fault tolerance techniques presented in the course "Dependable Computing". Fault injection experiments are carried out to validate the mechanisms implemented.

Description

A software service S acquires measurements using a set of sensors and computes a value on a sliding window of n numerical values.

An FMEA shows that this service S can lead to a catastrophic failure of the system in which it is used, in case of value error or absence of output value. This service S must therefore guarantee dependability properties, in the presence of permanent faults and transient faults.

The hardware architecture of the computer running this software a simulated bi-processor with stable storage on disk. Each processor also has its own local memory.

Each group of students must implement this service, develop mechanisms first to tolerate cash faults (duplex replication technique) and, secondly, accidental transient value faults (temporal redundancy technique). Tests by fault injection must be used to validate the various mechanisms.

Pre-requisites

Algorithmics, C/C++ programming, real-time operating systems, dependable computing

Useful info

Place

Toulouse