



UML for Embedded Systems

Exam FALL 2014

Intel® Smart Connect Technology Features and Requirements

Ludovic Apvrille

ludovic.apvrille@telecom-paristech.fr

<http://soc.eurecom.fr/UMLEmb/>

During an exam, you are not supposed to talk with someone else, by any means (including mobile phones, chat, etc.). Access to Internet is restricted to the website of the UMLEmb course only. During the exam, you may consult your own UML/SysML models made in the scope of the labs, but no other models. Electronic devices are not allowed at all, apart from your computer ;-).

A grade is provided for each question. 1 bonus point is given for the writing part.

1 Objective

The system to model is the "smart connect technology" from Intel®. The specification of the system is available online¹, yet, you ought to model only what is provided in this document. Your objective is to model the **software part of the smartconnect system**².

You have exactly 3 hours to model this system, and answer to various questions: the time is very short. This means that you have to take modeling assumptions. **Keep your diagrams simple and readable**, in particular the analysis diagrams.

Your grade takes into account your report and your models. At the end of the exam, **reports** (in pdf format) and **models** (in TTool format) **must be sent to me by email**. Also, **the report must be printed and given to Alexia Cepero right after the end of the exam session**. The report should contain explanations concerning your models, as well as relevant screen captures of models (e.g., interesting simulation traces, formal verification results).

2 System specification

2.1 Description

Overview

Intel® Smart Connect Technology is designed to update programs by periodically waking your computer from sleep/standby mode for a short time. This function works with applications that automatically get their data from the Internet, such as Microsoft Outlook* and Microsoft Windows* Live Mail.

Benefits

Intel® Smart Connect Technology automatically updates applications such as e-mail and social networks when your computer is asleep. With Intel Smart Connect Technology, you

¹<http://www.intel.com/support/services/smartconnect/sb/CS-033108.htm>

²The Smart Connect Technology is a "Software product" of Intel®

do not have to wait for your applications to update when you wake up your computer.

Features

The amount of time the feature waits to wake your computer can be set using the "Change Settings" option on main user interface. You have an option to select between three time intervals, 15 minutes, 30 minutes or 60 minutes. The longer the interval, the less battery consumption.

Intel® Smart Connect Technology automatically adjusts the update frequency if your computer battery level is dropping, or if the system temperature rises. Even though you select a 15-minute update frequency, your computer can sleep longer between updates to save battery (if present), or keep the system cool.

By clicking on the "Customize Schedule" button on the main user interface, you can set a time schedule for Intel Smart Connect Technology to keep the system in the sleep state during in Extended Power Savings mode. During these extended night hours, Intel® Smart Connect Technology will not wake your system up from sleep. This is meant to save battery power. The system will now wake up only at dawn (end of extended hours). Thus there are no updates during extended hours.

If your computer is equipped with an Intel Wi-Fi card and Intel® PROSet/Wireless Connection Utility, Intel Smart Connect Technology searches for Wi-Fi networks you have previously accessed. Your computer does not update until it recognizes a known Wi-Fi network. If you put your computer to sleep when it was not connected to the internet, it will wake up the next time, only when it detects a known network that you have accessed earlier and to which you have previously connected to automatically.

Your computer can also be woken up remotely using another feature of Intel® Smart Connect Technology, known as "Remote Wake". This feature can be enabled through the main user interface. This feature allows you to remotely wake your system up using the appropriate application from your remote device, even across subnets. This feature is only supported on Intel Ethernet and wireless network adapters and needs the appropriate Intel® Management Engine built into the platform. Contact your system manufacturer for verification of your system requirements for support for Remote Wake.

Requirements

Intel® Smart Connect Technology requires features that must be built into the BIOS of your computer system. For this reason, the technology must be included in the computer system at the time of manufacture.

If your computer system included Intel Smart Connect Technology, but the feature is not available, make sure that the capability is enabled in your system BIOS. Contact your system manufacturer for instructions on how to access the BIOS.

3 Assignments

I. Assumptions

1. Your assumptions should be clear. Do list them in the report: that list might evolve according to the models you will make afterwards. [2 points]

II. Requirements

1. Create a requirement diagram. [3 points]

III. Analysis

1. Make a use case diagram. [3 points]
2. Continue the analysis in the form you want: activity diagrams, nominal scenario, error scenarios, . . . : you are free to use the diagrams you want. Of course, the idea here is to show important points of the specification. [3 points]

IV. Design and validation

1. Make a block diagram. Put the emphasis on which blocks are used to model the system to design, and which ones are used either to model the environment, or to prove properties (observers). [3 points]
2. Make state machines, and provide a nominal simulation trace, as well as an error trace. [3 points]
3. Prove that the system always wakes up only during the valid period. Also, from requirements, take a property of your choice, and prove whether it is satisfied (or not!). [3 points]

Good luck, have fun!