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The questions the most frequently asked are listed here with their answer.

## **1 General questions**

### **1.1 Why use the PC as a PLC ?**

With a PC, you have a user-friendly interface operator permitting to follow the process in progress and very simple to develop.

It also gives you storage capacities required when a tracking is necessary.

The PC is an open architecture and standard. You are not forced to use the proprietary hardware and can put in competition the suppliers of PC, especially as the offer of the market is very large.

Finally, the usage of a same platform for the development and the execution of the application procures a certain comfort for the clarification, the enabling, the maintenance.

### **1.2 Does Optima PLC permit to program a PLC of the market?**

No, Optima PLC is foreseen and optimized to function only on a PC basis.

Future developments are planned however to permit the transportable code generation (C and C+), and executing itself on other OS than Windows.

### **1.3 Is Optima PLC a simulation tool ?**

PLC optima can be used for simulation and formation; in particular, the fact that it functions on PC facilitates its integration a lot within a set of other software.

But Optima PLC is before everything a true system of PLC on PC, for an industrial usage.

## **1.4 Questions concerning the real-time aspects**

The real-time aspects of Optima PLC are an important point of the product, and generate numerous questions.

### **1.4.1 Is Optima PLC a real-time system?**

Yes, the Optima PLC runtime uses for its execution a real-time kernel conceived and developed specifically by OptimaLog, to get under Windows a regularity and an optimized and adapted determinism to the automatic device.

The gotten performances permit to work with a minimal period of 1 ms, and a maximum jitter of the order of 20  $\mu$  s.

Contrary to some products competitors that pretend to real-time, Optima PLC is based therefore on a low-level software layer that preempts the Windows kernel, and not only on Windows multi-tasking scheduler.

However, as with all real-time systems executing over Windows, it doesn't make Windows a real-time OS. It is for example not possible to call functions of the Windows API from the real-time tasks of Optima PLC.

### **1.4.2 Can Optima PLC function without the real-time kernel?**

Yes, the real-time kernel is an option. Its usage is one of the compiling options.

The real-time kernel is deactivated besides by default.

### 1.4.3 Why is the real-time kernel deactivated by default?

The performance of the real-time kernel requires important resources (memory in particular). These are not always available on some PC :

- Old PC
- PC used to develop, but also for other usages
- PC with few of resource
- PC used to evaluate Optima PLC, but non dedicated to the performance of the application

To avoid all problem, the real-time kernel is deactivated by default from the version 2.5.

### 1.4.4 Does Optima PLC require the supplementary hardware to function in real time?

No, Optima PLC only uses resources of a standard PC.

### 1.4.5 I did think that it was possible to make real-time with Windows, I don't see what Optima PLC brings besides?

Windows is not designed for making "hard" real-time. If performance can be excellent, the very structure of Windows does not guarantee the consistency of them with a classic application.

The fact that Windows is a preemptive multitasking OS, which actually is necessary to make real-time, is not enough. Other conditions are required on the job management and their commutation, the structure of drivers, management of the expanded memory, etc. ...

The confusion is often managed by some market players who try to accredit the idea that their product guarantees real-time performance. It is also because of some elements of Windows itself : for example, the level of the highest priority that can be attributed to a task called "TpTimeCritical" while, as for all the tasks carried out at the user level Windows, there can be no question of genuine real time.

This inability to work in real time under Windows explains the emergence of a parallel market of truly real-time systems, based solely on software solutions or integrating additional equipment, and able to integrate more or less to Windows.

### 1.4.6 Why not use a real-time system of the market rather?

If you wish to make "classic" automatism applications, Optima PLC offers some advantages over real-time systems also proposed :

- Optima PLC is a tool dedicated to automation, it does not require sophisticated engineering competence developing specialized in real-time systems. A short training course or a self-sufficient in its grip.
- Optima PLC is lightweight, simple and easy to install and use.
- Optima PLC is much cheaper to buy and use than a real-time system, albeit powerful, but oversized and too complex for automation applications, although it is possible to conceive with this tool applications usually confined to complex real-time systems.

### 1.4.7 Does Optima PLC permit to make real-time with all PC?

Typically, there is no problem with standards uniprocessor PCs. However, some PC functions installed can disrupt the real-time functions of Optima PLC. On the other hand some multiprocessor PCs does not currently operate properly the kernel real-time, although this problem remains marginal.

The problems usually come from one or several drivers equipment installed under Windows, unconnected with Optima PLC, and "hiding" (disabling) sometimes the system interrupts for a time too important. There is then an increase in the "jitter" (ie variation) timing of the tasks of the PLC.

This problem is common to all real-time systems operating jointly with Windows. It requires you to perform some tests to measure the maximum jitter observed. In most cases it remains below 20  $\mu$

s.

On the other hand, the real-time kernel of Optima PLC requires substantial resources in memory, which can sometimes be a problem on some PCs used for other purposes, and which run many other applications.

Optima PLC can show the performance, particularly changes over the period of execution of the tasks of the PLC. In the event of disruption too high, a warning message is displayed.

#### 1.4.8 Does Optima PLC operate resources of the PC multiprocessors?

The multiprocessing mode is operated effectively, but differently depending on whether the real-time kernel is activated or no.

If the real-time kernel is activated : all real-time tasks are executed on a same processor. The tasks managed to the Windows level (priorities 8 and 9, displays) are executed indifferently on every processor.

If the real time-kernel is deactivated : all tasks are managed to the Windows level, and can execute indifferently on every processor.

#### 1.4.9 Does Optima PLC permit to make real-time with all interfaced hardwares?

No, the performances are not the same with all hardwares.

To create the interface with a hardware, two solutions are possible in the setting of Optima PLC :

##### **Usage of standard Windows drivers**

These drivers are relatively simple to interface with Optima PLC, but their use imposes the usage of the Windows API, with which it is not possible to make the true real time: it is impossible for Optima PLC to guarantee a time of reaction because the sequencing is managed directly by Windows.

The drivers currently based on a TCP/IP connection network with Ethernet use the network layer of Windows and don't procure any real-time performances.

The performances achieved by this type of driver are however very optimized in Optima PLC. The typical cycle time (time separating two actualizations of the inputs/outputs) is of about 10 milliseconds, with maximal variations of some milliseconds.

##### **Usage of specific drivers to Optima PLC**

The drivers developed by Optimalog generally permit to reach the hardware directly and to use it with the maximum possible performances. It is generally the case of the cards or facilities of which the specifications for direct access to the hardware are documented by the providers, as for example Hilscher.

The performances of these drivers can achieve the maximum allowed by Optima PLC in term of cycle time, that is normally the millisecond. These performances are however also dependent of the hardware.

#### 1.4.10 What performances does one get without the real-time kernel?

The base period is generally one millisecond, but can vary up to 3 milliseconds: the regularity is much worse than the real-time kernel. However, the period obtained is quite sufficient to run many applications.

**1.5 Is it possible to pass from a language of the standard automatically to another?**

No, and that possibility has never been considered by designers of the standard unlike a tenacious myth.

Some portability would be possible if a very small part of the programming possibilities was used in each language, but taken many difficulties. It is not currently a priority in Optima PLC.

**1.6 Is it possible to modify an application without stopping it?**

Yes, Optima PLC permits to make important modifications in an application and to put them on line with a lock time lower to the millisecond.

For more of information, to see "On line modifications".

**1.7 I did already work with Apigraf, can I migrate an Apigraf project easily under Optima PLC?**

If both tools are based on the same general principles, some differences make that the migration from Apigraf toward Optima PLC is not an immediate operation. This one remains however very simple.

The basis Apigraf language (combinatory) also exists in Optima PLC, however some adjustments must be performed by hand (to see Differences with the language original Apigraf).

- The declarations, in particular the definitions of mnemonics, must be redefined in accordance with the standard IEC 61131-3.
- The existing software modules in Apigraf don't have all their equivalent in Optima PLC.
- Some minor differences, in the types of variables for example, must be taken in account for the migration.
- The IHM part must be redone (man / machine interface) in Optima PLC.

**1.8 Where can I download the last version of Optima PLC?**

You can update Optima PLC in the following site :

**Web site**

<http://www.optimalog.com/downloadopl.html>

**Site FTP OptimaLog**

<ftp://optimapl@optimalog.serveftp.net>

**1.9 Does Optima PLC respect the standard IEC 61131-3?**

Optima PLC is one of the only software of its category that respects the definition set of the standard and its recommendations.

## 2 Technical questions

### 2.1 Hardware

#### 2.1.1 What configuration is necessary to make Optima PLC operate ?

The following configuration is advised to run the runtime Optima PLC.

- PC with a Pentium IV, 2 GHz
- Windows XP Service Pack 2 or Windows Vista
- One USB minimum (key protection)
- 1Go RAM minimum
- Filesystem NTFS advised

The workshop development can operate on a platform standard Windows XP SP2 or Windows Vista.

#### 2.1.2 What can arrive if I don't have memory enough on the PC?

To get some real-time performances at the runtime execution, Optima PLC must lock a big physical amount of memory. If this actual storage is insufficient, it can disrupt the real-time performances and in some cases provoke a crash of Windows.

At the time of the start, the runtime Optima PLC indicates in the log file (Events.log) if the quantity of RAM is insufficient to make operate the application.

### 2.2 How to make...

#### 2.2.1 How to get some information on the user's license of Optima PLC?

In the workshop or in the runtime Optima PLC, the first menu comprises an option "License" that provokes the display of information on the user's license.

#### 2.2.2 How to limit the hazard that the user corrupts data or the system under Windows?

When a PC is put in production with an application running under Windows, the risk is high that some users go modify data or operating parameters of the system so reckless.

To avoid this risk, it suffices that the system works in a session "no administrator", with limited rights. However, the application can run in this type of session, because access to the resources of the PC it is then prohibited.

To overcome this problem, simply set the application to run in the context of a user with administrator rights. To make this parameterization, see Windows session for execution and Parameterization of the Windows sessions.

#### 2.2.3 How to prevent the user to change operating parameters in the runtime?

You must activate the mode "management of the users" in the runtime.

#### 2.2.4 How to use timers in Optima PLC?

The different possibilities are described in the paragraph Techniques of time management.

#### 2.2.5 How to display some warning messages for the user?

See the functions library "Messages", that contains the functions permitting to display the information messages, errors, confirmation demands... See the documentation also of advanced programming.

### 2.2.6 How to force a SFC diagram to its initial step ?

See the block ResetSFC.

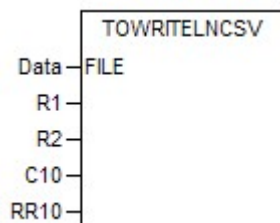
Note that this possibility is not considered in the standard.

### 2.2.7 How to write data in a file to reread them with a spreadsheet?

This operation is very simple.

- Declare the file in the menu Options / Output text files.
- Load the TextOut library in the standard libraries (tab "libraries").
- In the program, to use the TOWriteLnCSV functions (to generate a file with data separated by commas) or TOWriteLnTabs (to generate a file with data separated by tabulations).

Below, in the example one writes in the file Dated (the real name on disk is defined in Options / Output text files) the values of the variables numeric integer R1 and R2, of the C10 character string (the value will be framed of characters") and of the real variable RR10. The values separated here by commas (CSV format), a TSV format (tabulations) is also available with TOWriteLnTab.



### 2.2.8 How to enter values of parameters on my touch panel?

To see the option "automatic virtual keyboard" of the runtime, that permits to make appear a keyboard automatically on the screen when an input is necessary.

### 2.2.9 How to make the start of the PC start my application automatically?

To see the option "automatic start with the PC" of the runtime.

### 2.2.10 How to make my Optima PLC application communicate with another application?

The problem of the communication with another program (communication inter-processus) can be taken of several different manners.

#### Communication via a TCP / IP socket

It is the method generally carried for the communication between the Optimalog applications. In Optima PLC, the TCP library provides all necessary functions.

- Advantages
  - This method functions even though the applications are not on the same PC.
  - It permits to send important volumes of data.
- Inconveniences
  - It is a little more complex to program, because it is necessary to take into account the establishment of the communication.
  - It doesn't permit a communication since the tasks real-time.

#### Communication via the Windows register

This method consists in using the functions of the WinRegistry library to read and to write data in

the Windows register.

- Advantages  
Very simple method to put in work.
- Inconveniences  
The programs must absolutely function on the same PC.  
Doesn't permit to exchange big volumes of data.  
It doesn't permit a communication since the real-time tasks.

### **Communication by shared data area**

This method is based on the possibility to share a same area of data memory of the PC between several Windows-based applications. It uses the SharedMemory library.

- Advantages  
Ease of use in Optima PLC  
Area data can be shared fairly large (but not to exceed Mo).  
Instant Communication  
Once the initialization of the area carried out, access to data can be done from the real-time tasks.
- Inconveniences  
The programs must absolutely run on the same PC.  
The applications don't always have the possibility to use this technique.  
Attention to the consistency of data.

#### **2.2.11 How to make display fault messages simply ?**

To get an alarm display in a very simple manner, use the predefined flags of A alarms :

- define a mnemonic and a commentary for every variable used, describing each a defect.
- In the program, put to 1 or 0 the variable of defect
- configure the display of the alarms in the runtime.

Other solution for a more elaborated treatment of the alarms: use the software Optim'Alarm, especially conceived in this goal and perfectly integrated to Optima PLC.

## **2.3 Resolution of problems**

### **2.3.1 I define some mnemonics on variables standards but they don't appear**

To be taken correctly in account in the viewing screens, the definitions of variables standards with mnemonics (registers, inputs / outputs, etc...) must be performed in a block of global variables.

Besides, with a version previous to the v2.9.1, at least one of the declarations made in this block must be used in the rest of the project, otherwise the block is not integrated entirely to the compiled application. From the v2.9.1, the declarations of global variables are integrated systematically to the project.

### **2.3.2 I have a compiling error on a function name described in the documentation**

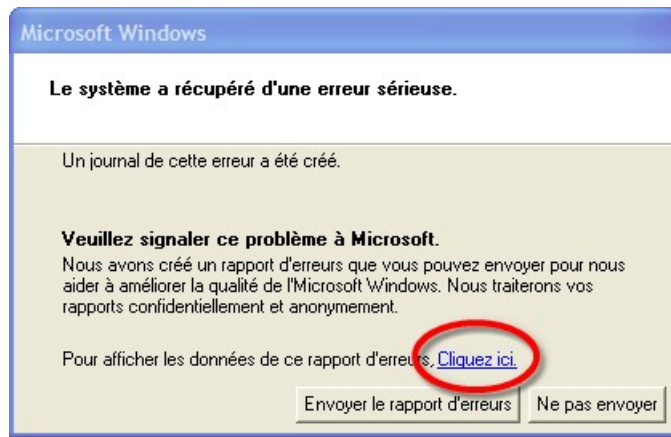
You found in the documentation a function (or a block of function) that you used in your program. But when compiling, a message indicates that the function is unknown.

The function is probably in a library that is not currently loaded. Only POU's defined in loaded libraries are really available or programming. Click on the tab "Libraries" of the POU's tree, and verify the presence of this library. So need, click on "Other available library" and load the one containing the wished function.

### 2.3.3 A blue screen is displayed or the PC restarts during the execution of the runtime.

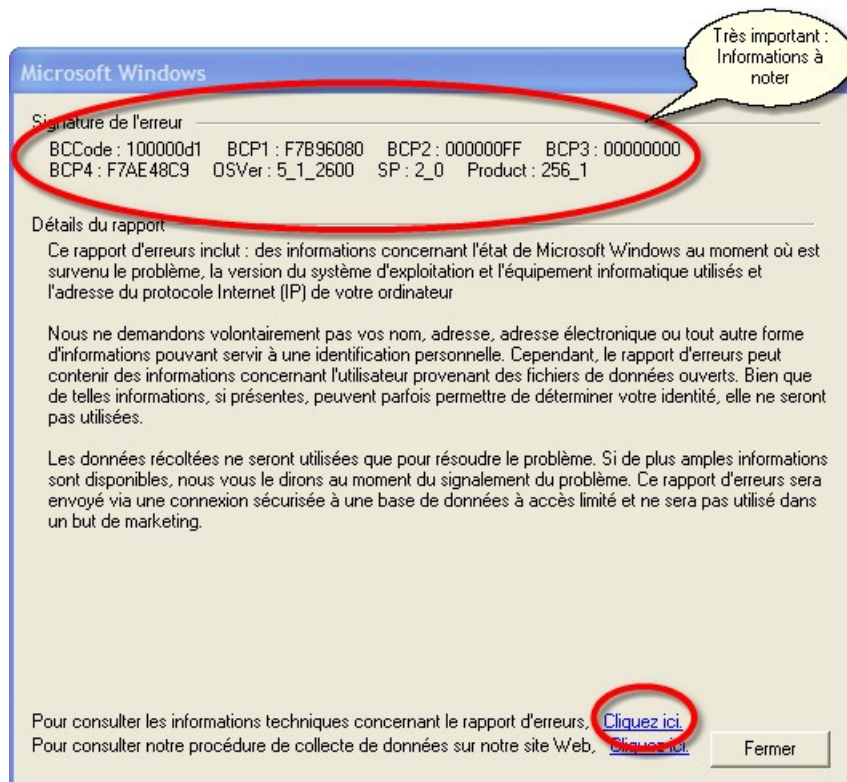
If a blue screen is displayed, note the main information in top of the screen.

In any case, at the time of the start according to the PC, an information message is displayed, asking for confirmation before sending the crash report to Microsoft.

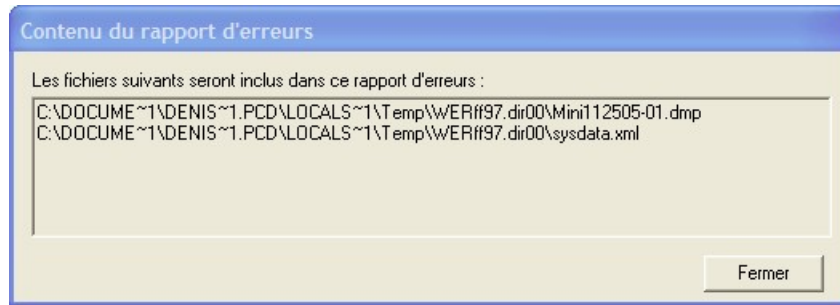


Don't send the report of mistake, save the files mentioned in this crash report, and send them, as well as your project, to OptimaLog for analysis and correction of the problem.

**Attention: the backup of the files mentioned below must be made before clicking on not to send."**



Files to recuperate and to send to OptimaLog (before closing the first window) :



**2.3.4 I have a problem with Optima PLC and I don't find the solution in the documentation, who may I contact ?**

For the supplementary support, contact Optimalog by email to the following address :

[optimapl@optimalog.com](mailto:optimapl@optimalog.com)

specifying your coordinates, the precise version of Optima PLC, the nature of your problem, and joining the maximum of files permitting to perform a diagnosis, in particular the files of your application.

Optimalog guarantees a total privacy, no file transmitted will be used outside of the diagnosis.

**2.4 Various**

**2.4.1 How can I reduce the compilation time of my application?**

The compilation time can take, in the extreme cases, a few score of seconds. It doesn't generally exceed about ten seconds.

Besides the speed of the PC used, the factor that influences the more on the compilation time is the number of loaded libraries and therefore of POU's to compile. At the time of the creation of a new project, Optima PLC places by default in the tab Libraries all necessary standards libraries. However, if you don't use some among them, closing them allows to decrease the compilation time considerably.