Project Loader Tool

TXV 003 10.01
fourth edition
May 2012

Change history

Date	Edition	Change description
July 2011	1	First version (corresponds to the tool condition in version 2.0.8)
August 2011	2	Parameters description added /PASSWORD and /USERNAME in chapter 4.4
Sept. 2011	3	Files transfer mode description added in chapter 4.2.2
May 2012	4	New work directory definition added in chapterv 2 (corresponds to the tool condition in version 2.0.23)

Contents

1 Introduction

Project Loader is a tool primirily meant for user easy loading of programmes packages created in Mosaic programming environment to PLC Tecomat type in Ethernet network. At the same time this tool enables to create a complete backup of PLC present programme in a form of ZIP archive which is compatible with programmes package generated by Mosaic environment. Using Project Loader tool we can load or download application programme machine codes, configurational charts, remanent registers contents, complete databox contents or memory cards files to or from PLC system. Newly loaded programme can be also backed up to Flash EEPROM memory. PLC restart is offered for a putting of new programme into operation, or PLC time setting according to operating personal computer time. Aparet from a nice graphic user interface the application also enables parametric activation for example using batch files.

2 Installation

Project Loader tool is a freeware programme distributed by Teco a.s. company mostly in *ZIP* archive form. The archive can be downloaded e.g. from www.tecomat.com. website. The tool is also a part of Mosaic flow environment installation. After the tool activation at first it is necessary to unpack the archive to any folder and afterwards to activate *ProjectLoader.exe* file in this folder. Make sure that your network card is working and that you are connected to PLC network.

After tool activation a work folder is created in a user documents directory:

...\Teco Utils\Project Loader

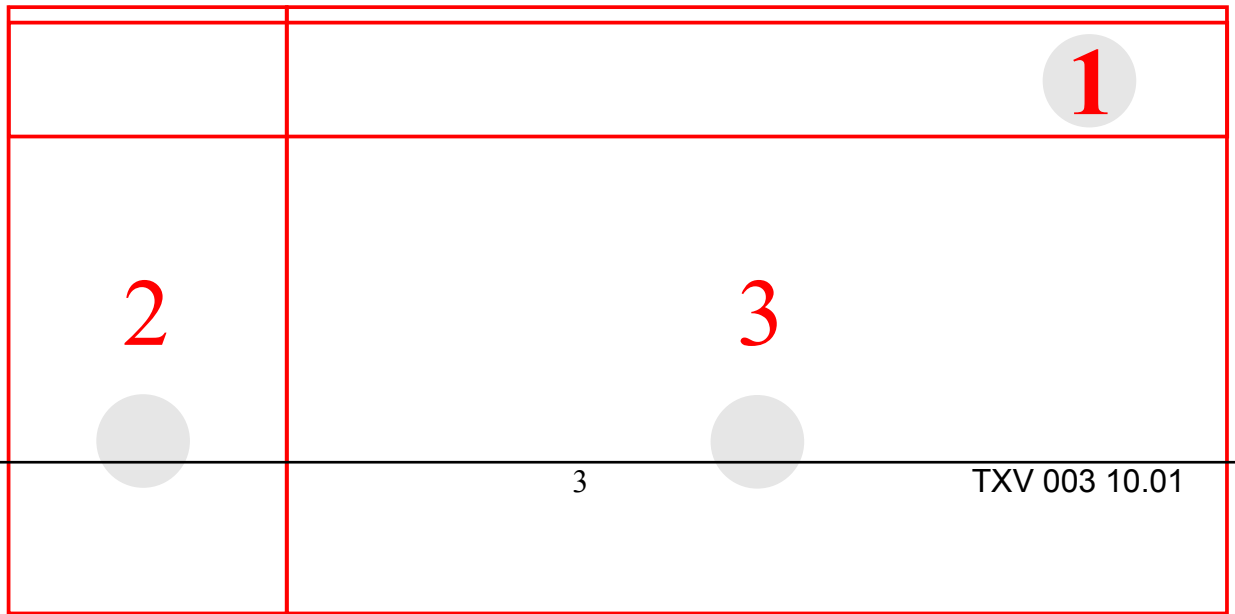
3 PC system requirements

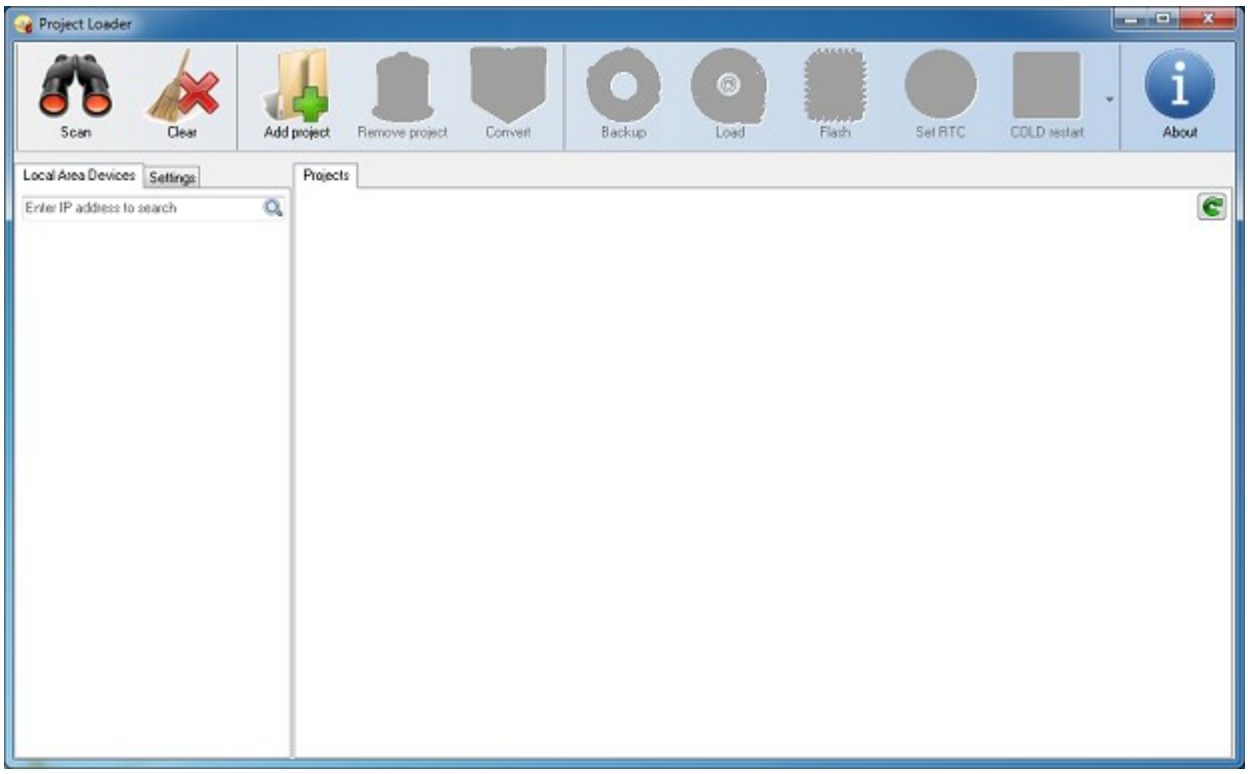
Project Loader tool can be used in all usual computers equiped with a network card and Windows XP, Windows Vista nebo Windows 7 operation systems.

4 Work with Project Loader tool

4.1 Tool activation

The tool can be activated by opening *ProjectLoader.exe* file from the installation package. After start the tool window will open:





4.2 Tool window

The window consists of three parts:

1) Upper toolbar
2) List of available PLC devices in the local network (*Local Area Devices*)
3) List of projects (*Projects*)

4.2.1 Upper toolbar

Toolbar buttons

Scan – searches the local Ethernet network and adds all found PLC connected to this network to the list of available devices.

Clear – deletes an update list of available PLC devices.

Add project – adds a new project to the list of projects.

Remove project – deletes a selected project from the list.

Convert – enables conversion between project archives of *ZIP* and *PIZ* type.

Backup – makes a complete backup of currently selected PLC device.

Load – loads a selected project from the list to a selected PLC device.

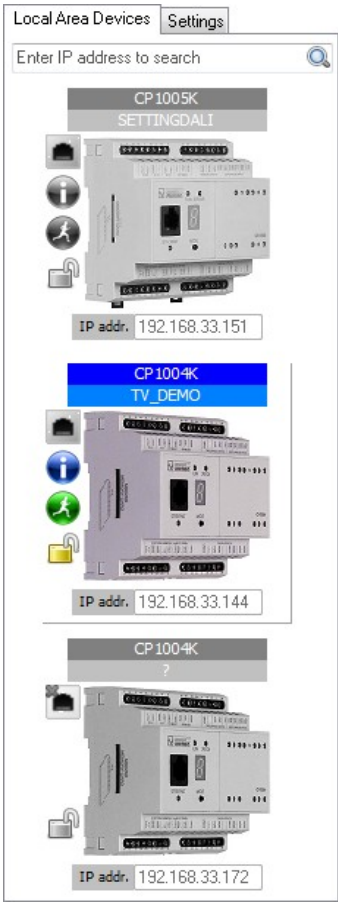
Flash – loads programme contents of a selected PLC device to its backup EEPROM memory.

Set RTC – sets time of a selected PLC device according to operating computer time.

COLD restart / *HOT restart* / *RUN only* – accomplishes an appropriate restart type of a selected PLC device. Restart type can be selected from an open menu.

About – Device information.

4.2.2 List of available PLC devices in the local network (Local Area Devices)



A list of available PLC devices can be generated by pressing the *Scan* button from the toolbarz nástrojové lišty. Searching progress is signalized by the following icon . If compatible devices are found in the mentioned network, list of them is generated in the sequence of their register. The list has a form of PLC devices images ordered below corresponding to the particular type of Tecomat range. Every displayed device is completed by iconic and textual description which enables its identification. If a device is found of which description does not correspond to any usually distributed Tecomat PLC device, but is able to comunicate, a Teco company logo is used instead of its image.

Each device description in a list consists of a heading including unit type name and a name of a currently loaded programme, side status icons and IP address field. Meaning of particular status icons is the following:

- marks connectibility to a particular device. An icon without a red cross means thar the device is in the network and we can communicate with it. A status of physical connection to the network, but impossibility of communication for example due to its reservation for another operating programme (e.g. Mosaic environment) is marked by the red cross.

- After moving the mouse cursor to this icon detailed information about currently loaded programme in a selected device is displayed.

- This icon signalizes current programme status, it it runs (*RUN*) or not (*HALT*).

- The lock image means authorised access communication service security. If the PLC

access is protected by a password, a user is asked about a user name and the password before starting his work.

All descriptive information is automatically updated always after a left-mouse button clicking on a particular device in the list. The device in a list is labeled this way, which causes all the graphics colouring, and is selected this way for other tasks. Devices in the list which are not selected are coloured in grey shades.

In case that the user knows a PLC device IP address, he wants to work with, it is not necessary to search all local networks using the *Scan* button in a toolbar. In some cases this operation can take a longer time. If the PLC address is known, we can give it to a searching field in the upper part of the list marked as „*Enter IP address to search*“. After an IP address correct imput to this field and pressing the Enter key, or clicking this icon  , a required device is found and added to an empty list.

This application is only used for work with PLC devices communicating on Ethernet network. Some network communication parametres as a communication port number and a delay size can be defined in *Settings* bookmark.

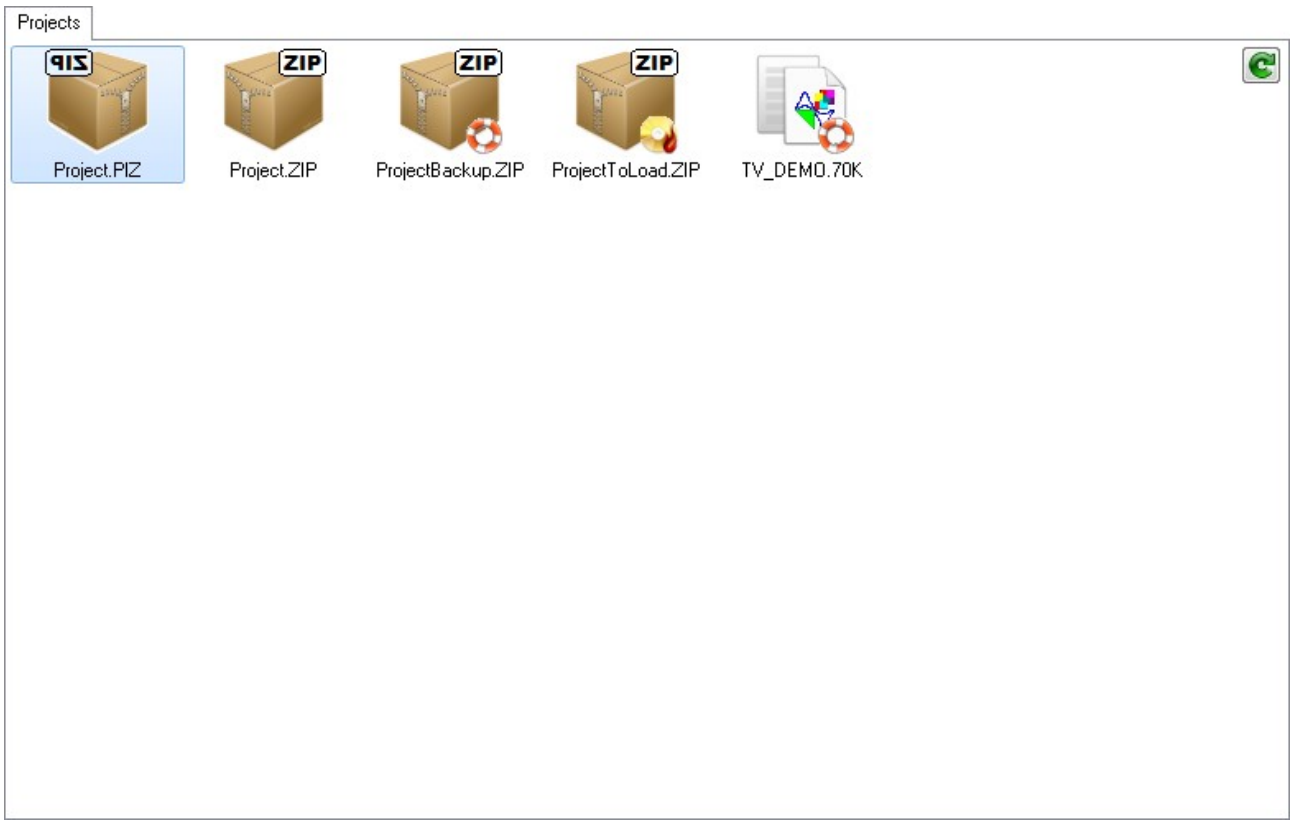
Default button can reconstruct communication parametres starting figures:

- *Port = 61682*
- *Timeout = 500 ms*

Settings bookmark also offers the option of file transfer mode setting (*File transfer mode*) between the tool and a memory card in PLC. Newer Tecomat devices enable the communication using EPSNET protocol in five independent communication channels, which can be used for example for file transfer between the computer and PLC. At the same time even five files can be transfered, which can shorten total transfer time. Older models can have problems with this type of communication or they don´t support it at all. In this case only a slow mode is possible, and the transfer is taking place only in one communication channel. The user is offered three communication modes:

- *Auto* (recommended) – the programme itself selects a communication mode (fast/slow) according to the connected unit type.
- *Fast* – fast communication mode.This file transfer tool makes five paralel comminication channels. Total transfer time is shortened, but successful transfer finishing is not completely guaranteed depending on connected unit type.
- *Slow* – slow communication mode. The files transfer takes place only in one communication channel. The transfer is safer, but the total transfer time is much longer.

4.2.3 List of projects (Projects)



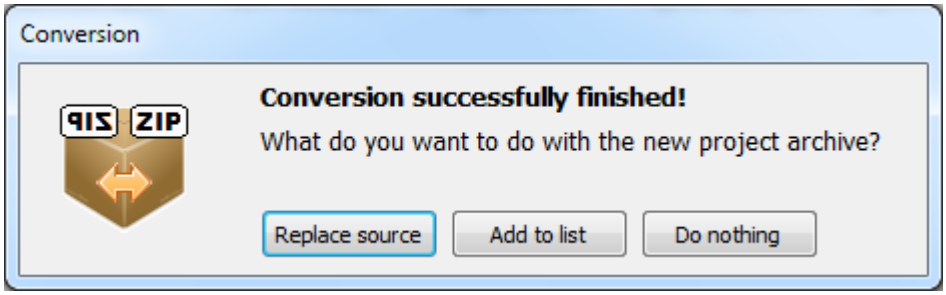
List of projects is an administrator of all the projects you can work with in Project Loader tool. New projects can be added to the list using *Add project* button from the toolbar, or removed by *Remove project* button. A project is considered to be a set of files in a form of *ZIP* or *PIZ* archives. The archive can contain files of application propramme machine code(**.70**), configuration charts files (**.MTB*, **.TAB*), remanent registers backup files (**.REM*) and databox (**.DBX*), or files meant to transfer to a PLC memory disc, which are all files located in the *SendRoot directory*, if such a directory exists. If an archive doesn´t contain any of the mentioned files, then such an archive isn´t valid for usage in Project Loader tool and is automatically removed from the list of projects. A project representative can be a machine code file for PLC Tecomat, it means the file **.70**. The whole project doesn´t represent only this code file, but the project loading to PLC the application finds every usable file (**.REM*, **.DBX* apod.), which is in the same address channel as this source file.

In a Project Loader work directory files *Backup* and *ToLoad* are automatically created after starting. File *Backup* is a starting directory for backup archives saving. File *ToUpload* is provided to a user as a starting directory for project files, which he intends to use a as a source for loading to a target PLC system. If a project placed in some of these directories is added to the list, the project icon has a special symbol. If it is *Backup* directory, the project is labeled by this symbol , projects from *ToLoad* directory by this symbol . This function is used by a user to make distinguishing backup projects from projects for loading to PLC device easier. Both directories contents is also default contents of a project list after device activation. Moreover it is whenever possible to read current contents and update the list by pressing this button .

4.3 Tool functions

4.3.1 Archives conversion (Convert)

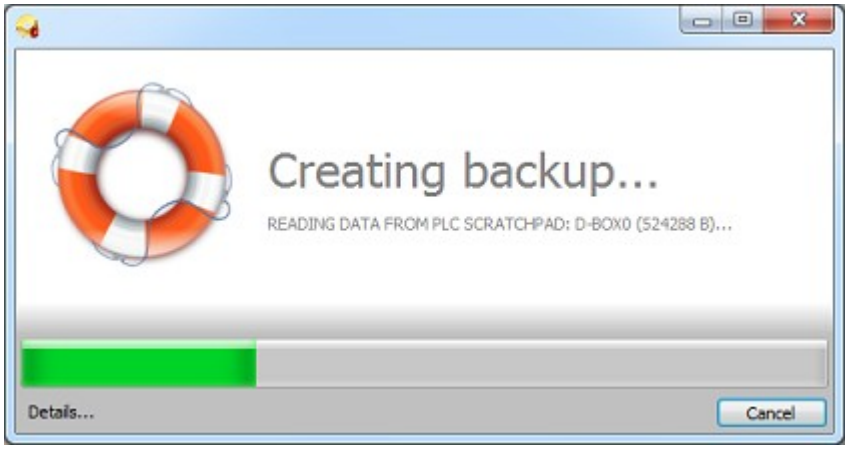
It is an additional function which enables bidirectional conversion between *ZIP* and *PIZ* archivesused for example by Mosaic environment. In Project Loader tool it is possible to use both types of archives, because necessary conversion is done automatically. For conversion from *PIZ* to *ZIP*, or from *ZIP* to *PIZ* it is necessary to highlight a required source archive in the list and mouse-cklick on button *Convert* in a toolbar. Converted archive is made automatically in the same directory as a source archive. In the case of successful operation implementation a user is asked what to do with a newly made archive from the point of view of the project list.



By choosing *Replace source* option a source archive in a project list is replaced by a newly made archive. By choosing *Add to list* a newly made archive is added as a new project to a project list. The third choice *Do nothing* makes no changes in the list.

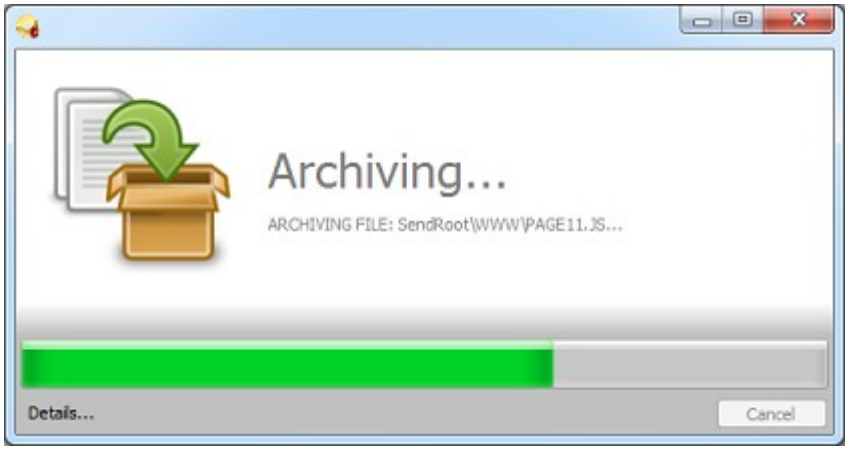
4.3.2 Making of PLC devices backup (Backup)

One of the main Project Loader tool functions is a function which enables to make a complete programme software backup of a selected PLC. After backup making at first it is necessary to highlight a required PLC system in a list of available devices. Pro vytvoření zálohy je nutné nejprve označit požadovaný PLC systém v seznamu dostupných zařízení. Making a backup is started by *Backup* button from a toolbar. After activation a dialoque window *Creating backup* is displayed, showing this operation progress.



Backup process is started by binary data of a programme machinery code , which is currently loaded in a selected device including corresponding configuration charts. The programme is saved as a binary file with *.70** extension, where behind the star symbol letters are added showing backup exchange type.Configuration charts file is marked *.MTB* (or *.TAB*) indication. Both files names are identical with a backup programme name which is limited by convention DOS 8.3 sfile system FAT. After successfulprogramme data downloadind the contents of remanent registers

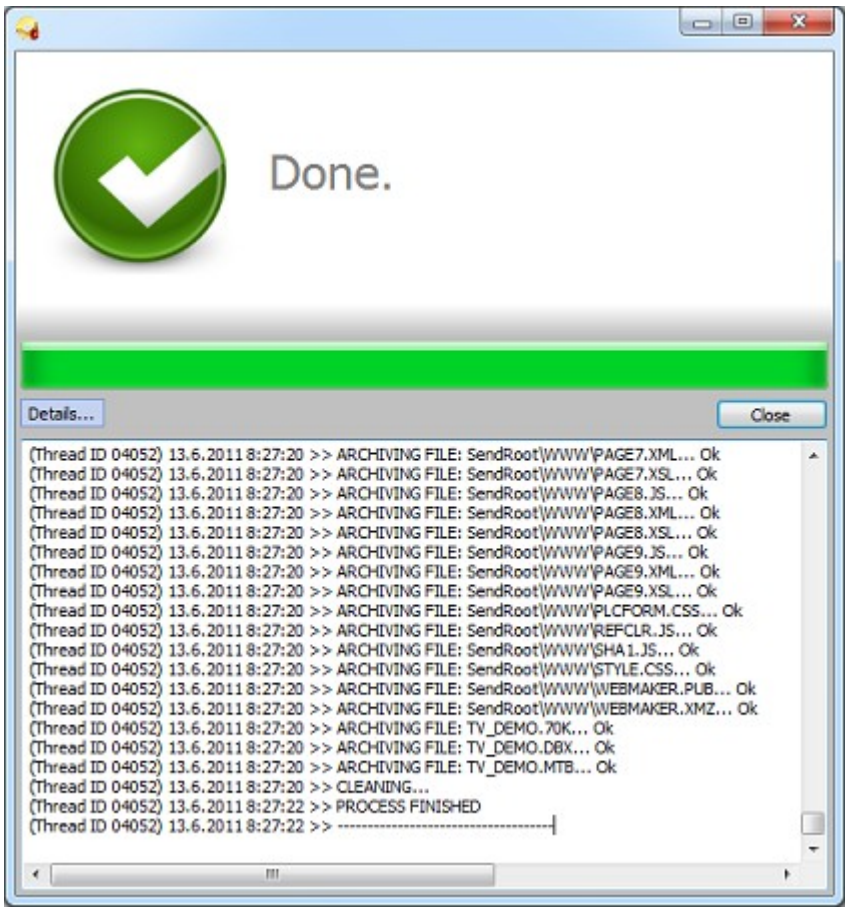
and a databox is also backed up. Length of remanent register data depends on its number , which is set in a particular switchboard. If the device has no remanent register, no backup is made. Databox complete content is always backed up. Backup files which contain data from both areas are files with extension *.REM* (remanent registers) and *.DBX* (databox). Both files names are again identical with a name of a programme loaded in PLC , limited by file system DOS 8.3Backup function continues with memory card content downloading, provided that the device has this media. This operation can require a relatively long time to be finished in the case of large quantity of data. Files from the memory card are saved to *SendRoot* subdirectory in the target directory. The backup process is finished by compression of all downloaded data to *ZIP* archive form named according to a programme which is contained in backup device with addition of formation date and time. Archiving process is shown in *Archiving* dialogue.



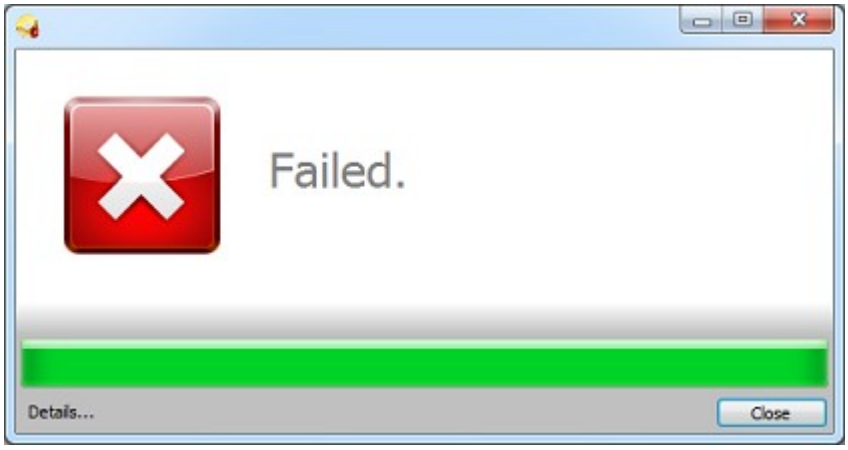
Described backup archive is automatically made and saved in *Backup* default directory which is located in a work directory. When the task is finished the user is offered an option of terget destination change by the form of a standard dialoque for file saving. If the dialogue is refused the archive remains saved in a default directory.

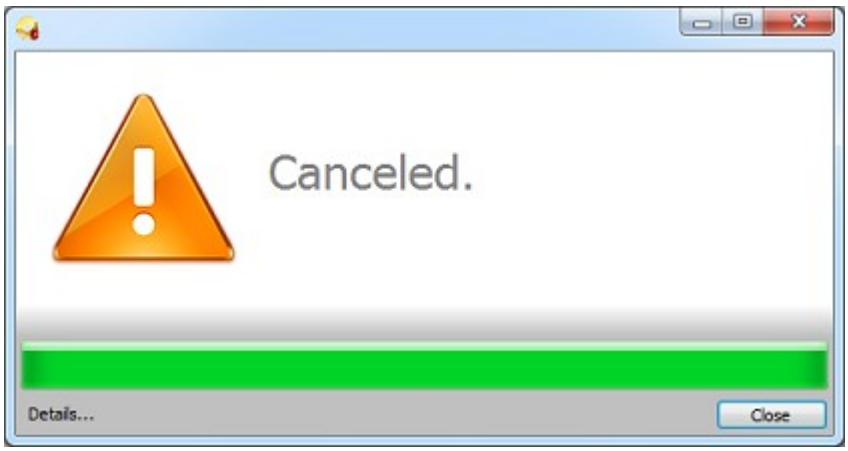
A detailed record of the whole backup operation can be shown by pressing *Details* button. Aafter the dialogue closing this record is automatically saved to *LOGFILE.TXT* file for later control.

Successful backup of a selected PLC device is signalized by *Done* dialogue.



If an error occures during the process or if a user finishes the backup process prematurely by pressing *Cancel* button, the end of activity is signalized by a corresponding dialogue. (*Failed* – an error occured, *Canceled* – operation canceled).

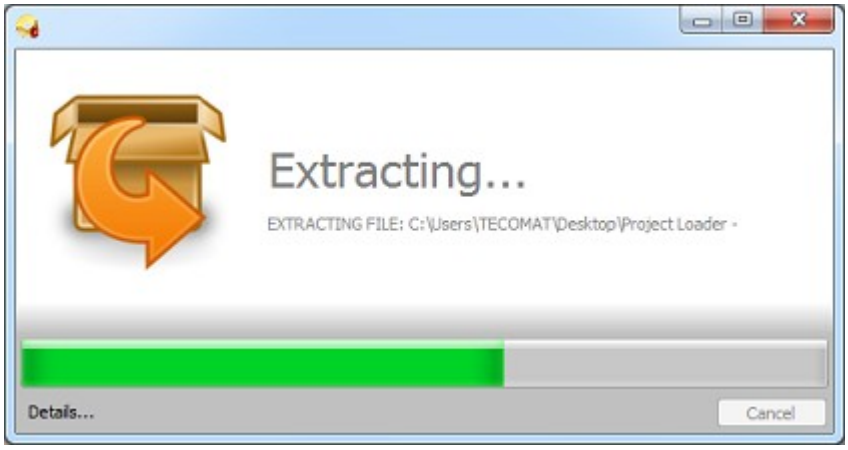




4.3.3 Projects loading to PLC devices (Load)

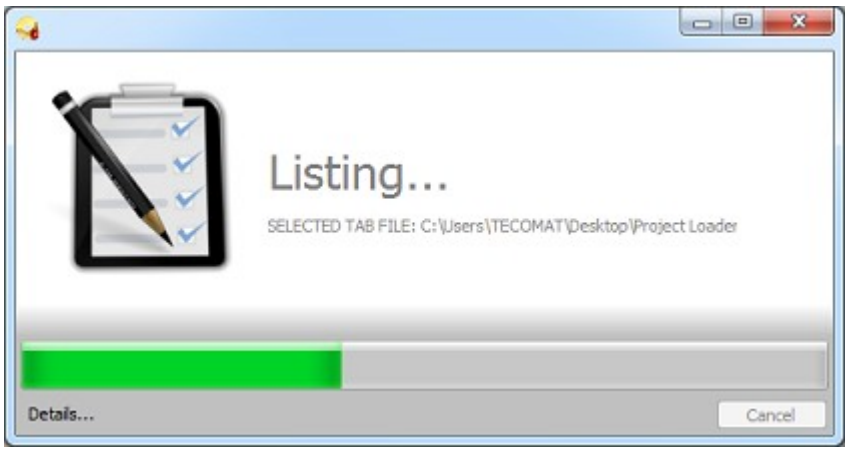
The second important Project Loader tool quality is an option of project loading, or complete backup package loading to a selected device. For project loading it is necessary to highlight a target system in a list of available PLC devices and a project source file placed in a projects list.After highlighting the pair, *Load* button is made available in a toolbar. Using this button you can start the recording process. This action can be also started by so called *Drag&Drop*, which means that the project can be moved using a mouse from the list of projects to a selected PLC system represented by an item in a list of available devices. Immediately after starting a user is asked if he wants to make a selected file backup to prevent unwanted loss of original data. **It is always recommended to make a backup, because changes made in the system are irreversible without a backup file!** At the same time a user is informed about a fact that after project loading it is necessary to put the system to HALT status, which means to stop its activity. **A user should make sure that PLC system halting will cause no serious property damage or that it won´t endanger human health!**

If a source file is a project archive of *ZIP* or *PIZ* type, this archive will be unpacked at first , which is indicated by *Extracting* dialogue.



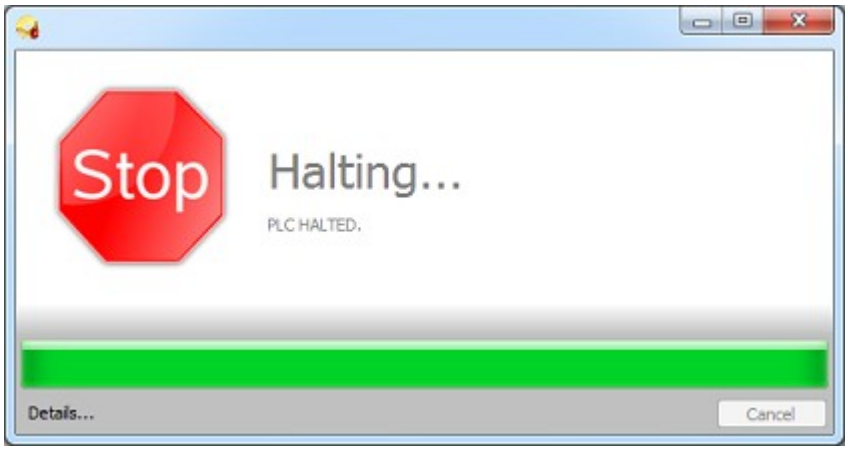
Files contained in an archive are extracted to a temporary file *Temp*, which is automatically made in a work directory. If a project, which isn´t an archive (for example machine code file **.70**) was selected in a projects list then a directory file way is considered to be a project.

Source file of a project is searched and on the basis of its contents a valid files list for loading to PLC is built. Searching operation is displayedby a process dialogue *Listing*.

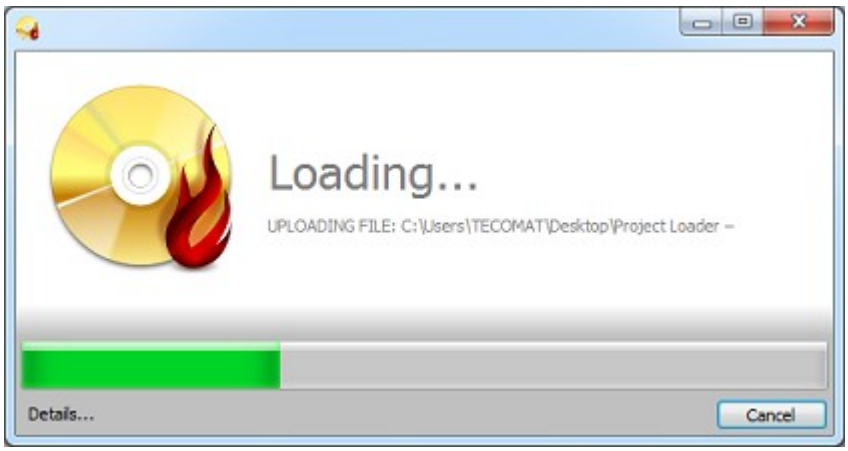


Selection of files for loading to the system has its rules which require existence of no more than one application programme machine code file **.70**, one configuration charts file **.MTB* (alternatively **.TAB*), one remanent register file **.REM* and no more than one databox file **.DBX*. In the case of finding more files of the same type a user is invited to seleck a required file. If only one file of a certain type exists in a source folder, it is added to a transfer list automatically. Loading operation will be continued if a machine code compatible file **.70** is found. Compatibility means that last characters of file extension *.70** is identical with a target PLC crentral unit. Only files placed in *SendRoot* directory are considered to be files specified for memory card system transfer. All other files which don´t suit any of previous requirements are ignored. Files and directories meant for transfer to PLC memory card must meet DOS 8.3 convention of FAT folder system, which means that files or directories names can´t exceed the length of eight characters, file extension the length of 3 characters and names can contain only valid characters. If a life which doesn´t suit these requirements is found in *SendRoot* folder, *Listing* process and then the whole loading process is finished with an error and *Failed* dialogue is displayed (see chapter 4.3.2).

After a successful generation of files intended for transfer the device is set to HALT status, it means that its activity is stopped. This operation is signalized by *Halting* dialogue.



At this moment everything is prepared for a new project loading to a selected PLC device. First of all files from *SendRoot* folder are transfered to a system memory card. The operation can take several minutes if there are a lot of transfered data. It is followed by loading of databox and remanent registers contents, if they are required by the project, finally the machine code including the configuration charts is loaded. Partial steps process can be seen in *Loading* dialogue.



As soon as the programme machine code is loaded successfuly , the whole operation was successful, which is signalized by standard *Done* dialogue. In the case of error or premature finishing of process loading, this dialogue replaced by dialogues corresponding to the status *Failed* or *Canceled* (see chapter 4.3.2).

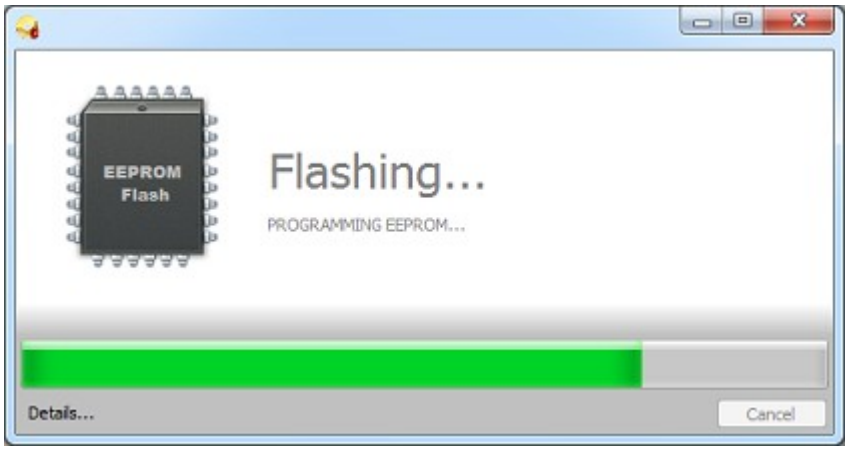
In case that backup memory EEPROM Flash is not activated, then the user is invited to its switch on and activation of a newly loaded programme record to this memory, which means that the programme in system can be restore even in case of backup battery discharging. If the application finds EEPROM memory in switched on status, the record is made automatically. v zapnutém stavu, zápis se uskuteční automaticky. Detailed information about recording to EEPROM Flash memory can be found in chapter 4.3.4.

4.3.4 Recording to EEPROM memory (Flash)

If a programme is loaded to PLC system, it is only loaded to RAM memory, in other words to memory, which will lose its contents after switching off its power. Powering of this memory type is in Tecomat systems is backed up by a battery. To prevent programme loss in case of backup battery failure it is suitable to record RAM memory contents to EEPROM Flash memory, which doesn´t lose its contents after power disconnection. After loading a programme to the system Project Loader tool automatically writes to the memory, only in case that this memory type is activated in advance. If the memory is not activated and a user refuses its activation and automatic record immediately after programme loading, he can still do it whenever by pressing *Flash* button in a toolbar.

If you want to write to EEPROM memory, it is necessary to have PLC system in HALT status, in other woeds it must be stopped. The operator is invited in advance to confirm this action. **A user should make sure, that PLC system stopping will cause no property damage or it won´t endanger human health!** After authorization all the process is launched - at first system switch to HALT status indicated by *Halting* dialogue.

After putting the system HALT status the process of EEPROM memory programming is launched and displayed by *Flashing* dialogue window.



Succeesful memory programming is confirmed by standard dialogue *Done*, otherwise a window *Failed* is displayed (see chapter 4.3.2).

4.3.5 PLC time setting (Set RTC)

It is only an additional Project Loader tool function, which enables PLC device system time setting according to system time of an operating computer, where the tool is launched. The whole process is represented bya dialogue window called *Setting RTC*.

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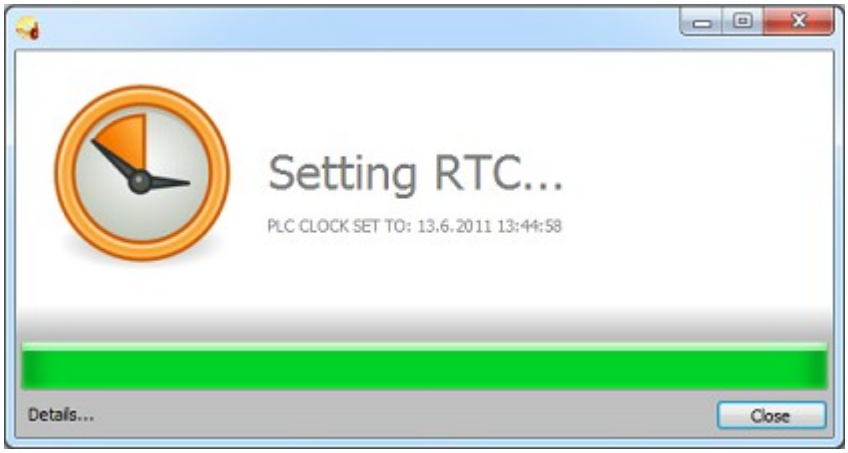


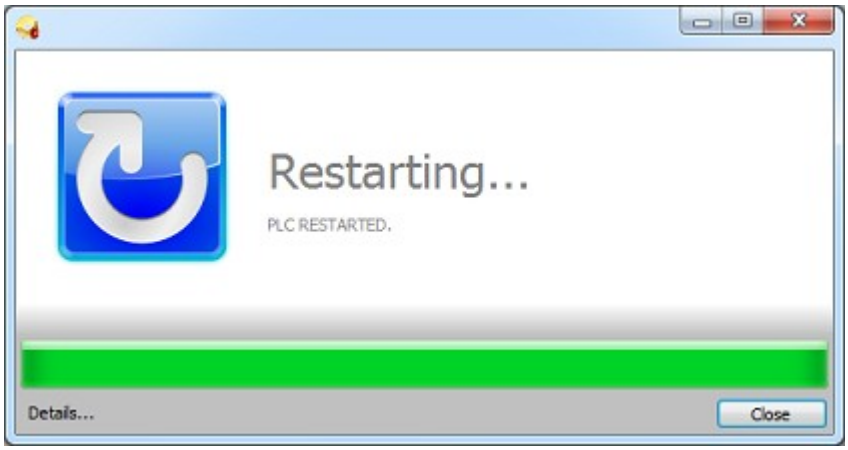
Successful time setting is confirmed by a standard dialogue *Done*, otherwise window

*Failed*is displayed (see chapter 4.3.2).

4.3.6 PLC device restart (COLD, HOT, RUN restart)

The last of offered Project Loader tool functions is an option of a selected device restart. Tecomat systems distinguisch between two types of restart, hot and cold. Hot restart enables to retain register values even during switched off power (remanent registers). Cold restart always does full memory inicialization. Particular types of restart can be selected in Project Loader tool by opening menu placed next to restart button itself in a toolbar.

Except both types of restart a user can also select transition to RUN status, when PLC system programme is launched without restart, in other words without any memory inicialization. *RUN only* in the menu corresponds to this function. After choosing one of the offered options and PLC system selection in a list of available devices, device restart or *RUN only* transition can be done by pressing abutton in a toolbar. The process is indicated by *Restarting* dialogue.



Successful restart process is confirmed by standard dialogue *Done*, otherwise *Failed* window is displayed (see chapter 4.3.2).

4.4 Parametric tool activation

Project Loader tool can be started parametrically, e.g. by batch file *.BAT. Application starts without user interface, only with standard dialogues of partial processes and after doing all operations described in input parameters will be automatically ended. Input parameters can be the followings:

/IP [IP adresa]
IP address of PLC device, which the communication should be established with. This parameter is required.

/PORT [číslo portu]
Number of a communication port. This parameter isn´t required. If it isn´t set, default port number 61682 is used.

/TIMEOUT [velikost prodlevy]
Size of communication delay is in milliseconds. This parameter isn´t required. If it isn´t set, default size of delay 500ms is used.

/BACKUP
Request for making a complete backup package of PLC device given by an address by a parameter /IP. This parameter isn´t required. If it isn´t set, no backup is made.

/LOAD [cesta k projektu]
Request for loading of a project set by absolute or relative way to a file into PLC device given by an address at parameter /IP. This parameter is not requiered. If it is not set, no project will not be loaded.

/EEPROM
Request for EEPROM Flash memory programming. This device is given by address at parameter /IP in case that this memory is not activated. This parameter is not requiered. If EEPROM is not active, memory will not be programmed.

/SETRTC
Request for PLC device time setting given by address at parameter /IP according to operating computer time. This parameter is not requiered. If it is not set, no time will be given.

/RESTART [COLD][HOT][RUN]
Request for a device restart set by an address by parameter /IP. Restart is of a specified type (COLD, HOT, RUN only). This parameter is not requiered. If it is not set, no restart will be done.

/QUERIES
Request for permission of required dialogues and warnings display. This parameter isn´t required. If it isn´t set, the dialogues and warnings aren´t displayed.

/USERNAME
User name, which should be used for communication with PLC system, which is protected by authorized access. This parameter is required only in case, that a parameter PASSWORD is present in a command. In case that no parameter is given and the device requires authorized access, tool activity is finished with an error.

/PASSWORD
User password, which should be used for communication with PLC system, which is protected by authorized access. This parameter is required only in case, that a parameter USERNAME is present in a command. In case that no parameter is given and the device requires authorized access, tool activity is finished with an error.

/MODE [AUTO][SLOW][FAST]
Communication mode for file transfer. You can select from three modes (AUTO, SLOW, FAST).

This parameter isn´t required. If it isn´t set, automatic mode is chosen.

Example

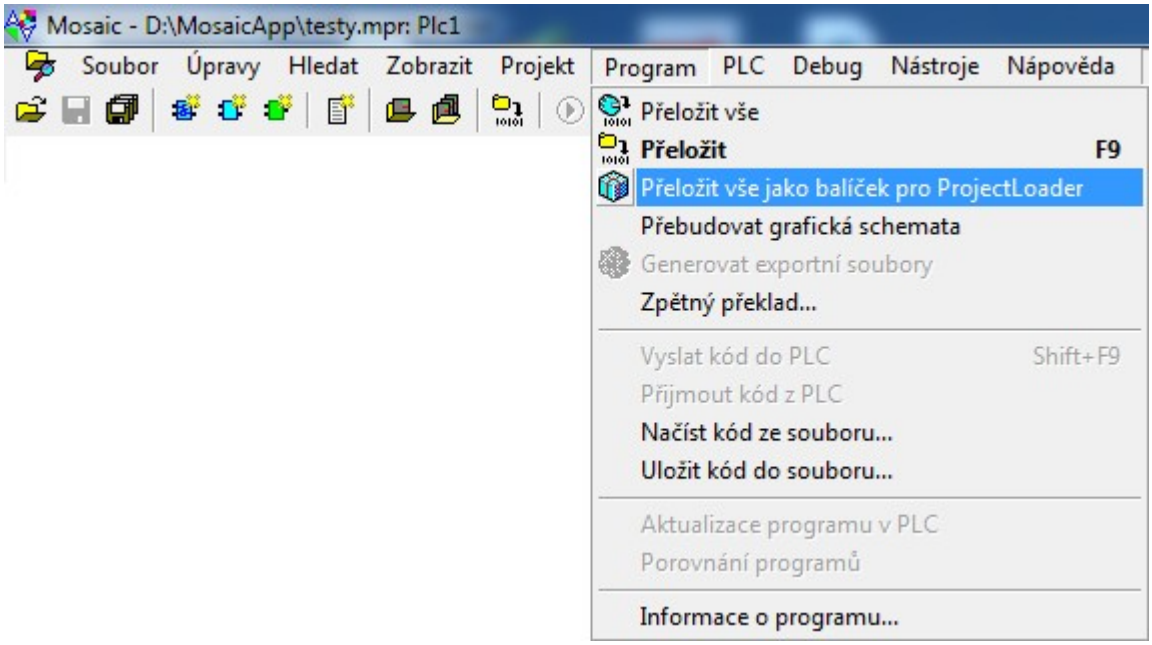
Parametric activation of Project Loader tool according to a following record

```
ProjectLoader.exe /IP 192.168.1.100 /PORT 61682 /TIMEOUT 1000 /BACKUP
/LOAD C:\Users\TECOMAT\Desktop\project.ZIP /EEPROM /RESTART COLD
```

will establish a communication channel with PLC device on 61682 port and IP address 192.168.1.100 with delay of 1000ms. After successful connection a backup of existing pragramme software will be made. It will be saved in a ZIP archive form in the default folder for backup, which is placed in a work directory. Subsequently a new project file with location *C:\Users\TECOMAT\Desktop\project.ZIP* will be loaded to this device. Afterwards a newly loaded programme will be written to EEPROM Flash backup memory and finally cold restart will be done. Time of the system won´t be changed. The user won´t be asked about anything during all the operations and Project Loader tool will be automatically finished after its activity ending.

5 Making a package for Project Loader in Mosaic environment

Support for ProjectLoader tool was implemented even to Mosaic flow environment, which now enables to create a programme package, which can be used directly in Project Loader tool. The package can be made by an option *translate everything as a package for Project Loader* in menu programme placed in main Mosaic environment toolbar. Programme package is made in a project directory as PIZ archive. This archive can be directly added to a project list of Project Loader tool and loaded to PLC.



Objednávky a informace:
Teco a. s. Havlíčkova 260, 280 58 Kolín 4, tel. 321 737 611, fax 321 737 633

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