

April 2025

Best practices for web visualization

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Welcome

Dear visualization user,

this set of recommendations should be used as a guideline for performance optimizations in visualization projects. They have been collected through the analysis of projects and will continuously be extended.

We divided the best practices into PLC and EASY UI improvements because both projects have a great effect on the performance of your visualization.

We hope that they help you to get the best out of our visualization solution.

Your EASY UI Designer team



Performance

Software versions

Since we have integrated optimizations inside the EASY UI Designer and the firmware, please make sure that you use at least the following versions, at best the latest one.

What can I do?

FW 1.12

- Optimized, more stable LEM behavior
- Improved initialization of the FAST UI Runtime to load projects faster

FW 1.13

- Improved user management (login, user change)
- Improved start sequence
- Optimized reading of language files

EUID 1.6:

- Optimization of the start up of visualization projects, e.g. no start delay necessary

EUID 1.7.1

- Improved parsing of information during startup due to cleaned up vw7 files



PLC Project

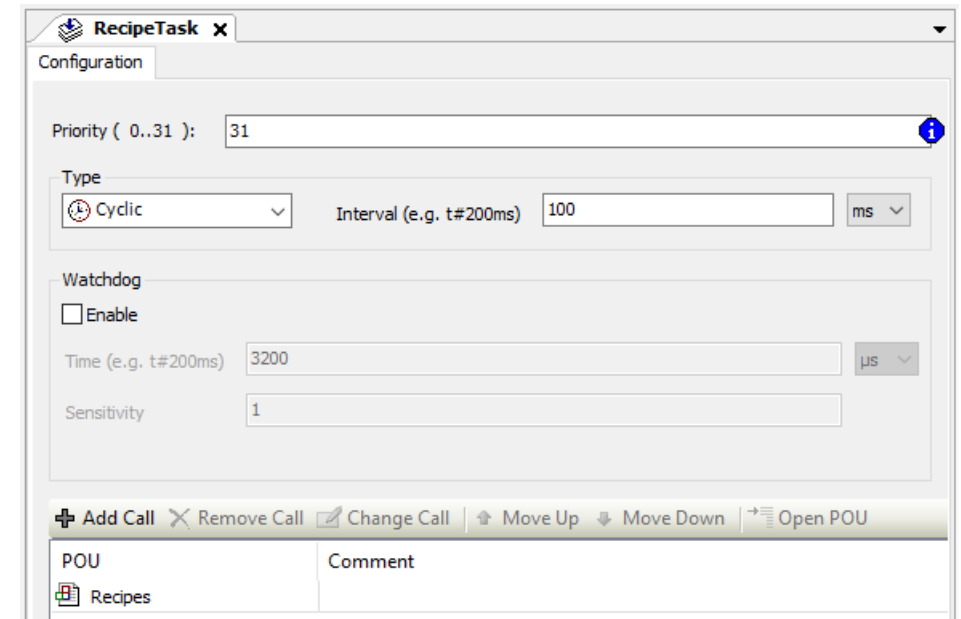
Performance

Task configuration

The configuration of the tasks has a huge influence on the performance of your visualization. It is therefore important to know what code runs on which core. The PLC Code and EtherCAT run on the real time core (RTC), whereas OPC UA and the visualization run on the non real time core (NRTC).

What can I do?

- **Freewheeling tasks** use ALL free PLC cycle time and therefore have to share their processes with the visualization; this can lead to issues and **should be avoided**.
→ The best alternative is to use *cyclic tasks* instead with a high *cycle time* and *priority*.
- **Disable watchdog** because this could stop the PLC application.
- Notes:
 - When you use the LEM, the whole logbook will be imported at startup to create the alarms which are defined in the Lenze Error Management in the PLC Designer
 - Task priorities 1..15 run on the real time (RT) core
Task priorities 16..31 run on the non real time (NRT) core



Performance EtherCAT

In modular machine designs it might be the case that not all EtherCAT participants that are projected are also physically available. To save computing time, it is therefore advisable to deactivate them. The function is comparable to the option *Disable device* in the device tree of the PLC Designer.

What can I do?

You can deactivate motion axes under an EtherCAT slave as follows:

- Use the function *ResetAxisConnector* to deactivate the Axis_Ref

```
Axis_InstanceName.ResetAxisConnector();
```

- Function is available in the library from this version on:
L_MC1P_MotionControlBasic Bibliothek V3.30.0.x. (ControllerDevDesc V1.11.x.x)



EASY UI Project

Performance Variables

The number of variables and the scan time have an effect on the performance.
Please remember the current limits:

- c550: 2000 PT
- c520: 1000 PT
- c430: 500 PT

If you received a custom license that allows more power tags, it's a customer specific solution.
We really need to handle these with caution and be aware of potential consequences.

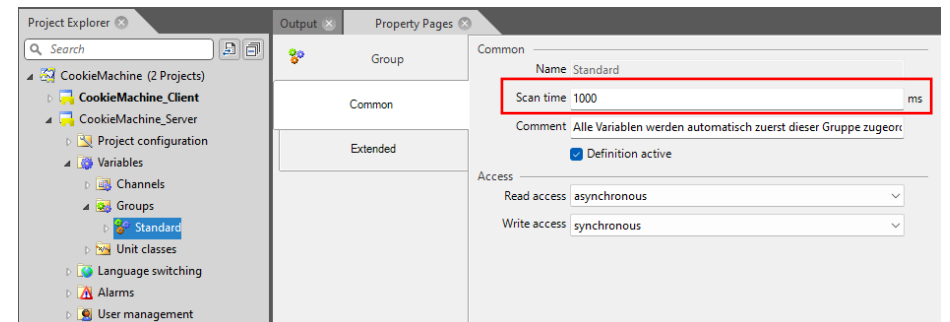
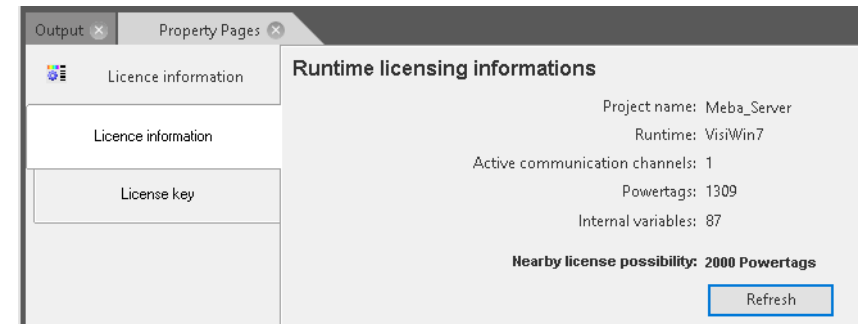
What can I do?

1. You can check the number of power tags in the server project. Please make sure that you need all variables that are included in the symbol configuration.
2. The scan time defines in which interval the OPC UA server informs the client about changes. When you want to write in parallel, this can cause a lot of traffic.

We therefore recommend to set the minimal scan time as follows:

- c430: 1000ms
- c5xx: 500ms

Note: The scan time divided by two has to be added to your scan time to get a rough estimation about how fast variables are updated on your UI. You can experiment a bit with the values (e.g. go down to 250 ms) to find the right configuration for your project.



Performance

Text and system components

Reading in large text files requires time. It is therefore advisable to remove all texts that are not needed in the project. These texts are saved in the vw7 file in the Server.

What can I do?

1. Delete outdated texts

Please „clean up“ the *Server.vw7* file if your project was created with a EUID version < 1.7.0:

Reduce texts in *LanguageSystem* by deleting the TextGroup “Components”

MyProject_Server.vw7

```
27      <LanguageSystem>
28      <LanguageSystem.Languages>
29      <Language Name="English (United States)" Lcid="1033" />
30      <Language Name="German (Germany)" Lcid="1031" />
31      </LanguageSystem.Languages>
32      <LanguageSystem.TextGroups>
33      <TextGroup Name="Application">...
47      </TextGroup>
48      <TextGroup Name="Components">...
49      </TextGroup>
50      <TextGroup Name="Dialogs">...
51      </TextGroup>
52      </LanguageSystem.TextGroups>
53    </LanguageSystem>
```

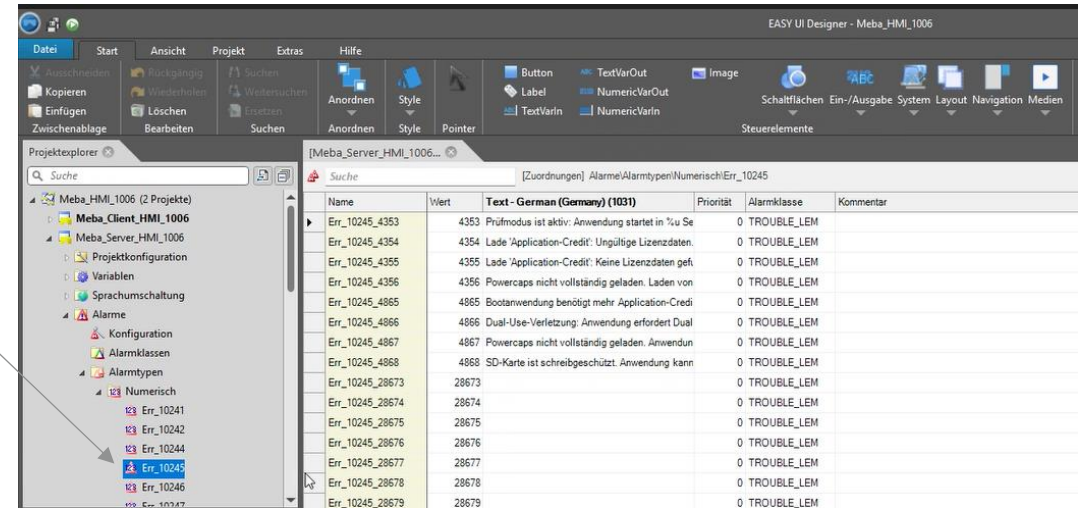
2. Reduce LEM texts

If you use the LEM, all texts are imported in English and German.

You should take a look at the error messages and delete all the texts that are not needed inside your machine.

3. Availability of both German and English texts

The texts will be read out at runtime from an online-logbook, but only in English. If you don't need German texts in your process visualization, you can delete these translations as well.



The screenshot shows the EASY UI Designer interface. The Projektexplorer on the left lists the project structure, including 'Meba_Client_HMI_1006' and 'Meba_Server_HMI_1006'. The main window displays a table of error messages (Zuordnungen) for 'Alarme/Alarmtypen/Numerisch/Err_10245'.

Name	Wert	Text - German (Germany) (1031)	Priorität	Alarmklasse	Kommentar
Err_10245_4353	4353	Prüfmodus ist aktiv: Anwendung startet in %u Se	0	TROUBLE_LEM	
Err_10245_4354	4354	Lade 'Application-Credit': Ungültige Lizenzdaten.	0	TROUBLE_LEM	
Err_10245_4355	4355	Lade 'Application-Credit': Keine Lizenzdaten gefi	0	TROUBLE_LEM	
Err_10245_4356	4356	Powercaps nicht vollständig geladen. Laden von	0	TROUBLE_LEM	
Err_10245_4865	4865	Bootanwendung benötigt mehr Application-Credi	0	TROUBLE_LEM	
Err_10245_4866	4866	Dual-Use-Verletzung: Anwendung erfordert Dual	0	TROUBLE_LEM	
Err_10245_4867	4867	Powercaps nicht vollständig geladen. Anwendun	0	TROUBLE_LEM	
Err_10245_4868	4868	SD-Karte ist schreibgeschützt. Anwendung kann	0	TROUBLE_LEM	
Err_10245_28673	28673		0	TROUBLE_LEM	
Err_10245_28674	28674		0	TROUBLE_LEM	
Err_10245_28675	28675		0	TROUBLE_LEM	
Err_10245_28676	28676		0	TROUBLE_LEM	
Err_10245_28677	28677		0	TROUBLE_LEM	
Err_10245_28678	28678		0	TROUBLE_LEM	
Err_10245_28679	28679		0	TROUBLE_LEM	

Performance Images

Reading in large image files requires time. It is therefore advisable to use vector-based file formats instead of pixel-based graphics (jpg, png,...), to reduce the file size to a minimum and to limit the number of images.

What can I do?

1. Check which image formats you have used in your project and replace pixel-based graphics (jpg, png,...) by
 - choosing icons from the available **icon fonts** or by
 - using **vector-based** formats such as svg.
2. If you need to integrate pixel-based graphics, **reduce the size to a minimum**, e.g. icon on a button.
3. Don't create many layers of images but rather use svgs and edit them at runtime.

✗ DON'T



- large image with little information: 1920x1024
- large file size

✓ DO



- extract element: 46x101
- reduced file size

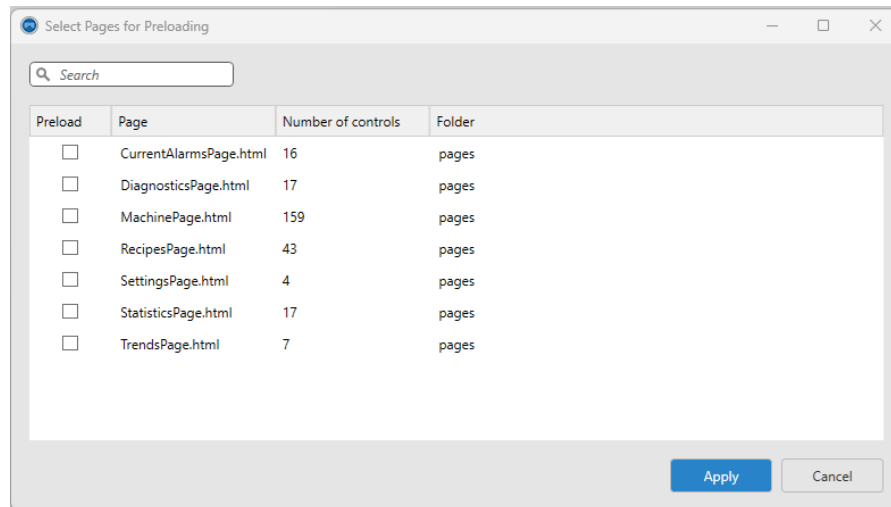


Performance Controls

The more controls you load, the longer the application needs to initialize them. Please keep this in mind when designing your pages.

What can I do?

1. **Reduce the number of controls** used on a page or view.



2. In the case of custom controls (your own library) try to keep the JavaScript code as **efficient** as possible.



Performance

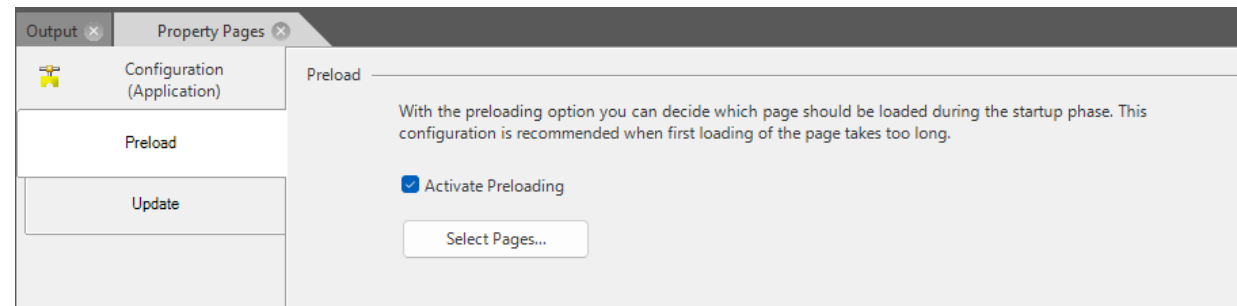
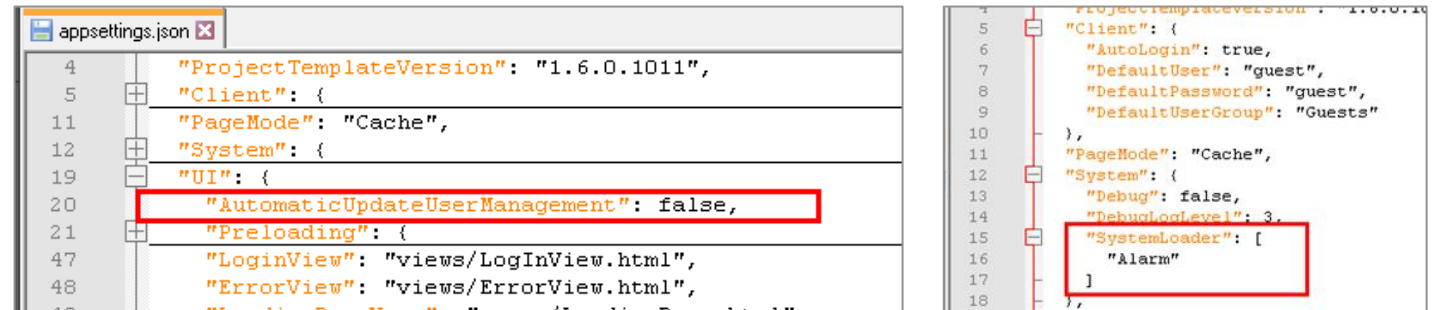
Loading and update of systems

There are several system configurations inside the appsettings.json that can be optimized.

The file can be found in the folder MyProject_Client/appsettings

What can I do?

1. Update project to 1.7.1
 1. In earlier projects, all client servers were started (Alarm, Trend, Recipe, Login) per default. Decide which systems you use and **delete the entries** in the *SystemLoader* that are not needed.
 2. Deactivate automatic update of user management
2. Use our *Preloading* feature to preload pages that take longer to load either because of the number or type of used controls.



Option can be found under *Project_Client > Project configuration > Application*

Performance

Autostart and startup parameters

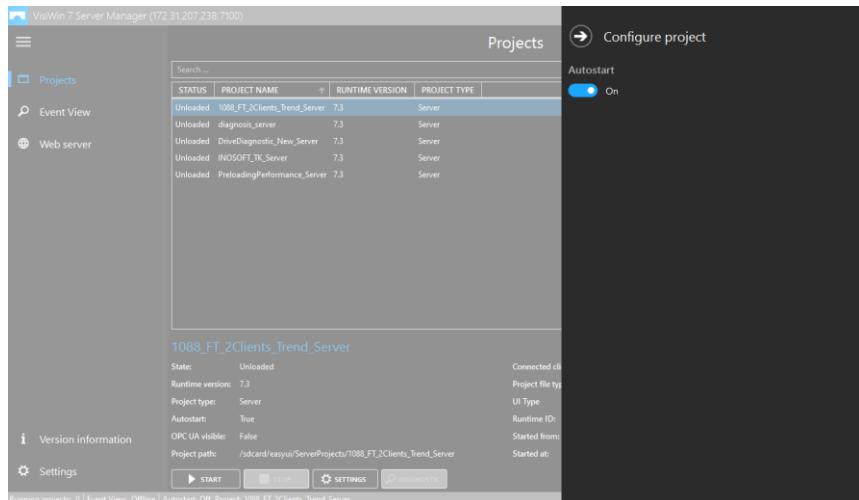
There are several system configurations inside the appsettings.json that can be optimized.

The file can be found in the folder MyProject_Client/appsettings. To use the options, you need to make sure that you have the newest index files, so please copy the folder *index* and the *index.html* out of a new client project to your current one. Since they can be customized, they are not automatically updated.

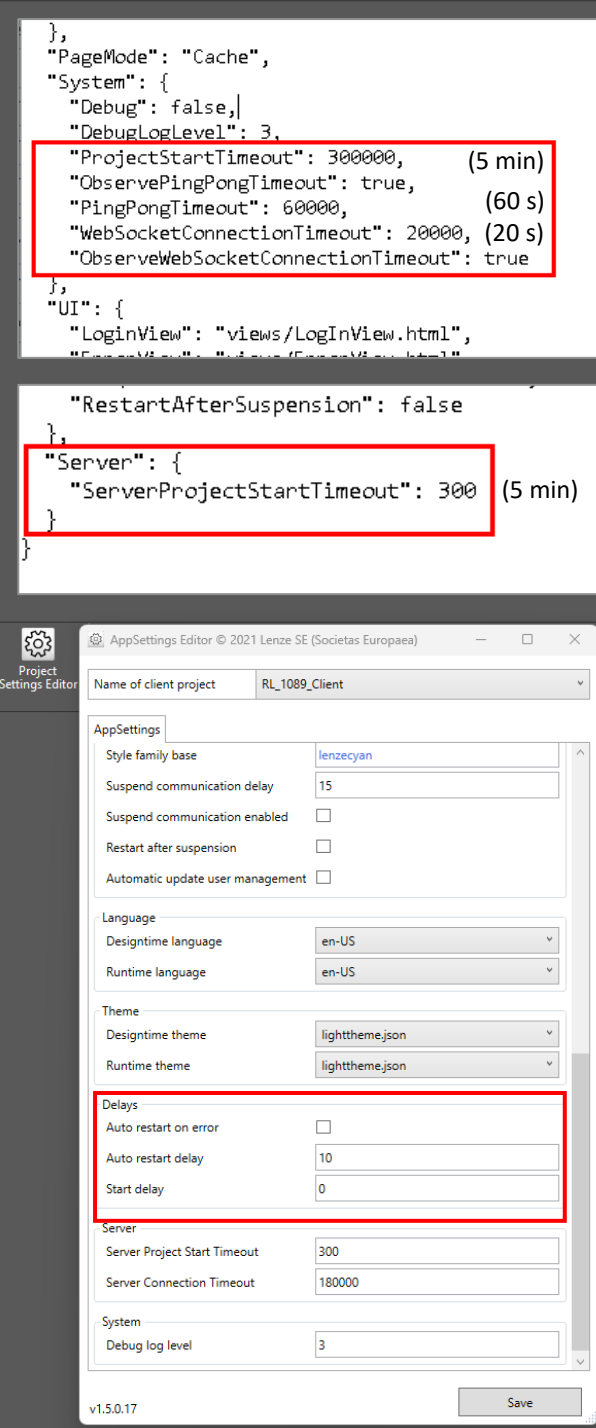
What can I do?

Reduce the start time by starting the client and server in parallel:

- Set the server project in autostart in the server manager.



- Set the timing parameters as follows in the project settings editor (see right) and in the appsettings





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**Thank
you**

Lenze SE

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