

Engineering Environment for Programmable Controllers: “GX Developer2”

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1. Introduction

An appropriate engineering environment for efficient software development is required for today's larger, more complex user systems in FA systems. We have developed “GX Developer2” as engineering environment for programmable controllers. GX Developer2 is designed to be compatible with the integrated platform, allowing linkage and data sharing with the engineering environment of other FA products. This boosts work efficiency through each system construction phase (system design, program development, debugging and start-up, and operation and maintenance) and reduces man-hours in the development stage.

2. Features

2.1 Improved programming efficiency

By fully utilizing users' software assets and operating the library function, centering on the function block (FB) as well as the linkage function with other types of MELSOFT products, users' programming efficiency can be remarkably improved.

- The Library Management Function makes it easier to use software assets, for more effective program de-

velopment.

- Sharing of labels with other MELSOFT products makes it easier to link data with other setting tools, for more effective program development.

2.2 Improved debugging efficiency

Provided with a simulation function (Virtual Programmable Controller Function) for running a sequence program on a personal computer, debugging can be performed on the personal computer with ease, without the need to load the sequence program on an actual programmable controller. System quality can be established before making adjustments at users' sites, thus remarkably shortening the on-site adjustment time.

- (1) Integrated tools for more efficient debugging

A simulation tool, which was an independent item in the conventional series, is now integrated into GX Developer2 as a component for fast changeover between the sequence program edit and simulation screens. The user can immediately modify the problems found in debugging and efficiently confirm the results of modification by repeating the simulation.

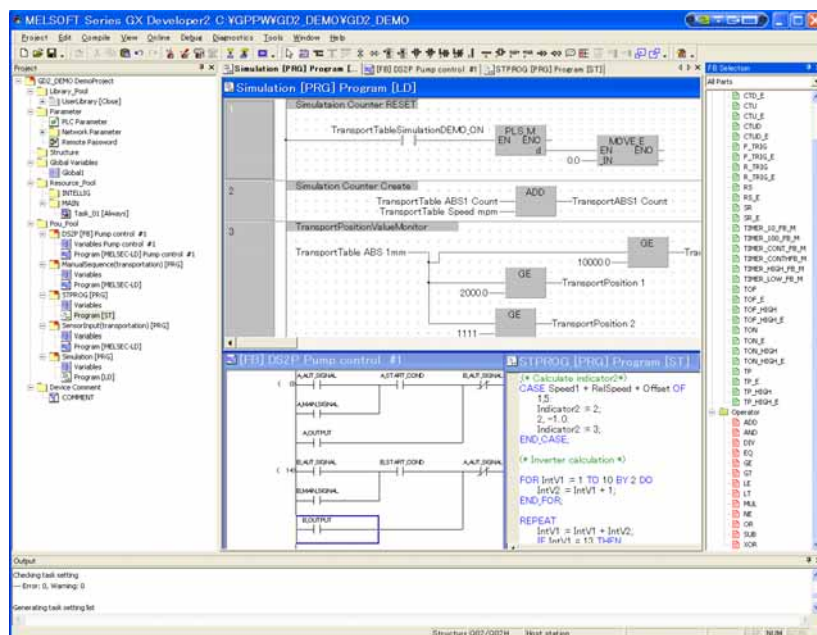


Fig. 1 GX Developer2

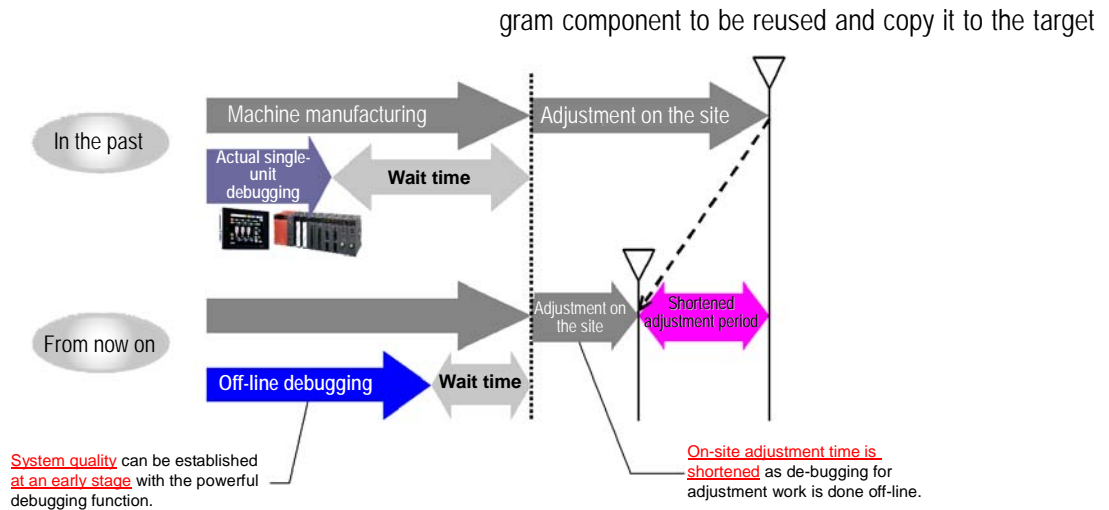


Fig. 2 Shortening of system adjustment time by using simulation function

(2) Multiple controller simulation for improved debugging efficiency

With the conventional series, only one simulation function at a time was executed on a personal computer. For larger user systems, a new debugging environment allows simultaneous function activation of up to four programmable controllers for simulation. By simulating multiple GX Developer2 projects at once, networked systems can be efficiently debugged.

2.3 Reinforced security for operation and maintenance

The user authentication function has been reinforced for data access in the operation and maintenance phases in order to prevent project access by unauthorized users and to prevent leakage of authorized users' know-how.

- The user authentication function can protect the project data.
- Access to data can be controlled based on authorized user levels.

3. Problem and Solution

3.1 Improved reusability of programs through the library function

With the conventional series, when reusing program components such as structures or FB, the user had to find a particular project that contained the pro-

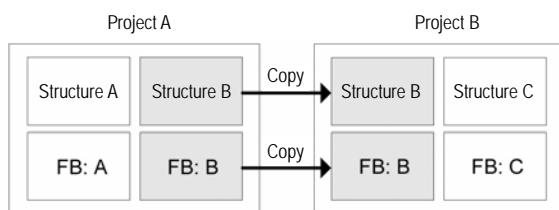


Fig. 3 Recycling method of program component by project copy

gram component to be reused and copy it to the target

project (Fig. 4). This made it difficult to locate the project containing the desired program components for reuse (Fig. 3).

Our solution in GX Developer2 is to store structures and FBs that can be used as program components in a library separated from the project. This separation allows program components to be managed by function, so the user can easily obtain and use the desired program components from the library (Fig. 4).

3.2 Improved debugging efficiency

3.2.1 Simultaneous simulation of multiple programmable controllers

With the conventional series, only one programmable controller was debugged by a single simulation operation. It was necessary to repeat the simulation when debugging multiple programmable controllers connected via a network.

However, with GX Developer2, parallel simulations can be performed by changing the transmission between applications from the conventional shared mem-

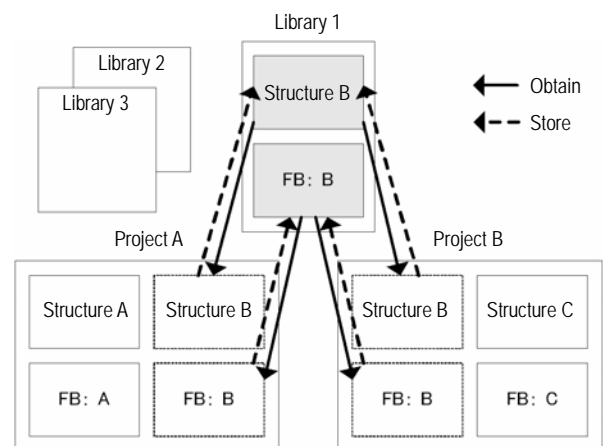


Fig. 4 Recycling method of program component by library

ory operation to TCP/IP transmission and activating the function of multiple programmable controllers simultaneously on a single personal computer.

3.2.2 Increased response speed during simulation

Simultaneous execution of the monitor function and simulation function of GX Developer2 on a single personal computer faces problems with execution speed of the simulation function and responsiveness of the user interface. For example, when priority is given to the simulation function to secure a certain level of execution speed, the simulation function occupies much CPU time of the PC, thus lowering the monitor performance on GX Developer2.

Our solution design as shown in Fig. 5 secures the wait time (B) that is equal to the time (A) spent for executing simulation to allow other applications to run. For example, even if multiple simulations are executed simultaneously, the user interface response speed is not affected.

3.3 Reinforced security for operation and maintenance

In the severely competitive semiconductor and liquid crystal device industries, it is crucial to prevent leakage of know-how. In addition, programs must be protected from accidental alteration by operators unauthorized to edit them.

GX Developer2, equipped with user authentication and access control functions, offers off-line project security.

4. Conclusion

We have developed "GX Developer2" as engineering environment for programmable controllers. We will increase the functions to improve programming efficiency for version upgrades in the future.

References

- (1) Zenei Kamiya and Nobuyuki Ban: Integrated Programming Environment for Programmable Controllers, Mitsubishi Electric Corporation Technical Report, Vol. 74, No. 07, 2000

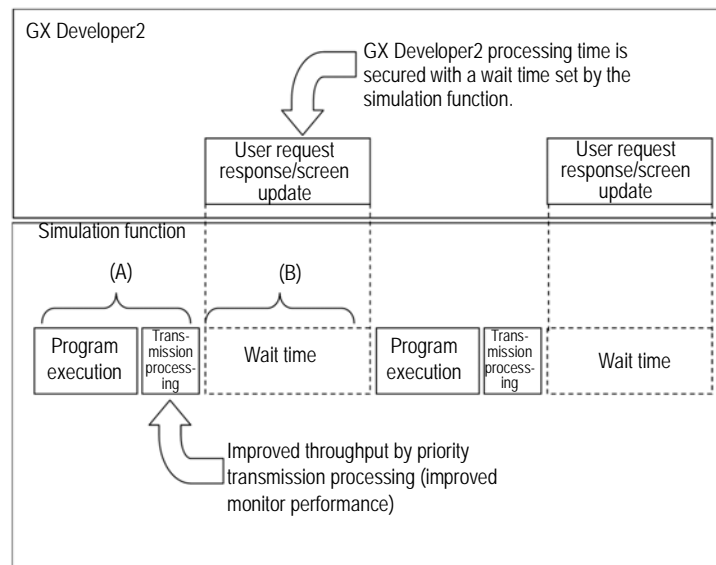


Fig. 5 Adjustment of simulation function run-time