

Unlocking Design Engineering Productivity with Industrial DevOps



In the era of Industry 4.0, design engineers are the architects of automation, crafting complex PLC programs that drive efficiency, safety, and productivity across the industrial landscape. Yet, the tools and methodologies they rely on often lag behind the rapid advancements in software development. This white paper delves into the critical challenges design engineers face in PLC code development, explains the underlying reasons for these issues, and showcases how Copia Automation's Industrial DevOps platform provides a transformative solution.

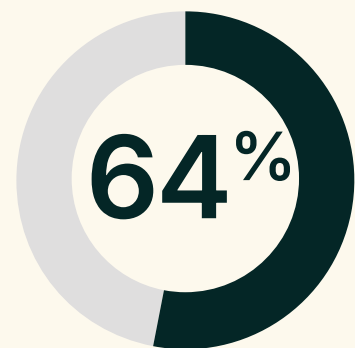
The Harsh Reality of PLC Code Development: A Constant Struggle for Efficiency

Imagine a typical scenario: A design engineer, tasked with updating a critical PLC program for a sprawling manufacturing facility, must navigate a maze of legacy code scattered across servers and shared drives. The latest version is unclear, collaboration is fragmented, and manual file transfers are the norm. This isn't a rare occurrence; it's the daily grind for many engineers working with PLC code.

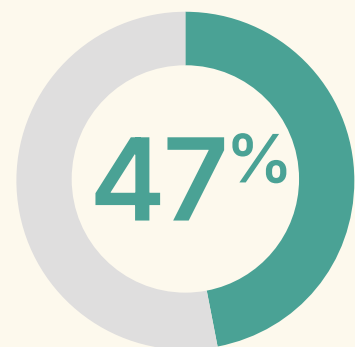
Key pain points, as highlighted by "[The 1st Annual State of Industrial DevOps Report](#)," include:

Version Control Chaos:

- Relying on file names and shared drives leads to confusion, errors, and lost productivity. The report reveals that 64% of respondents rely on cloud-based drive systems for version control, and 47% use Excel spreadsheets, highlighting a significant opportunity for improvement. As Kaleb Best, Controls Engineering Manager at Westfalia Technologies, puts it, *"Copia's tools allow us to track changes with clarity and confidence. We now have a system in place that supports*



Respondents rely on
cloud-based drive systems



End user respondents use
Excel spreadsheets



collaboration and minimizes errors." This resonates with the challenges faced by many organizations where, according to the report, 45 hours on average is spent per month on debugging versus 4 hours spent on code review.

- Tracking changes across multiple projects and sites becomes an uphill battle.
- The risk of overwriting critical code looms large.

Collaboration Bottlenecks:

- Manual code reviews and file sharing cripple the development process.
- Lack of real-time collaboration tools hinders teamwork and knowledge sharing.
- Communication gaps lead to misunderstandings, errors, and rework. This disconnect is particularly painful in the collaboration between design engineers and the construction and implementation teams on-site. Design engineers often send code updates via email or shared drives, leading to version confusion, missed updates, and frustrating rework. As Brian O'Sullivan, Lead Senior Automation Controls Engineer at TARGAN, describes, *"We'd have one version — one zip file essentially — saved on a server with a date in the name. And then when someone wanted to write or add anything new, I would have to encapsulate it in a function block and save it as another version."* This highlights the manual and error-prone nature of traditional collaboration methods.
- On-site teams struggle to provide effective feedback, resorting to phone calls or marked-up screenshots, which further slows down the process and increases the risk of errors.



45 hours on average
is spent per month on
debugging versus 4 hours
spent on code review.



Change Management Nightmares:

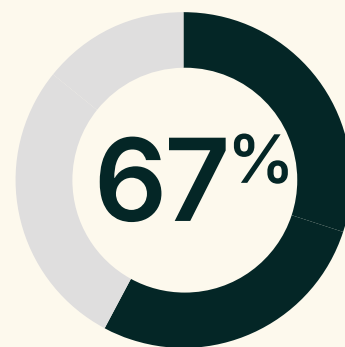
- Implementing updates and bug fixes across multiple projects is complex and error-prone.
- Auditing code changes and ensuring compliance with regulations is challenging.
- The **inability** to quickly revert to previous versions increases the risk of costly downtime. The report found that 67% of respondents experience downtime costs of \$1 million or more per hour, with 36% facing costs exceeding \$5 million per hour. This underscores the need for robust systems like Copia, which enables quick reverts and minimizes downtime. As Toby Varland, Vice President at Varland Plating, states, *"Copia has been life-changing... With Copia, we are setting new standards for quality and efficiency."*

Visibility Black Holes:

- Understanding the complete lifecycle of PLC code is difficult, making it hard to track dependencies and identify potential issues. This lack of visibility is echoed by Automation NTH's Project Manager, Chris Secrest, who states that before Copia, *"we had thousands of copies of PLC files."* This highlights the challenge of managing code effectively without a centralized system.
- Lack of insight into code changes and performance metrics hinders optimization efforts.

The Binary File Conundrum:

- Traditional version control systems struggle with binary files common in PLC programming environments.
- Merging changes and comparing versions becomes a manual and error-prone process. Copia tackles this challenge head-on with its ability to handle and visualize changes in binary files, a feature that was a *"huge motivating factor"* for Varland Plating in their adoption of the platform.



Respondents who experience downtime costs of \$1 million or more per hour



Why the PLC World Lags Behind: Unpacking the Roots of the Problem

The challenges faced by PLC design engineers are not by chance; they are deeply rooted in the history and nature of industrial automation:

Legacy Systems and Infrastructure:

- Many industrial facilities rely on aging PLC systems and software that were not designed for modern development practices.
- The cost and complexity of upgrading these systems can be a significant barrier.

The Unique Nature of PLC Code:

- PLC code is often tightly coupled with specific hardware and processes, making it less portable and adaptable than traditional software.
- The use of specialized programming languages and tools further complicates development.

The Emphasis on Reliability and Safety:

- Industrial automation systems are often critical to safety and production, leading to a conservative approach to development and change management.
- The need for rigorous testing and validation adds time and complexity to the development process.

The Skill Gap:

- There is a growing gap between the skills required for modern software development and the traditional skills of PLC programmers. [The State of Industrial DevOps Workforce Report](#) highlights data that projects that that U.S. manufacturing industry will need 3.8 million new employees by 2033, highlighting the urgency of addressing this gap.
- This gap hinders the adoption of new tools and methodologies.

The challenges faced by PLC design engineers are not by chance; they are deeply rooted in the history and nature of industrial automation



Limited Collaboration Tools:

- Existing collaboration tools often fall short of the needs of design engineers and on-site teams. Email, spreadsheets, and shared drives are inefficient for managing code changes and providing feedback, leading to communication breakdowns and delays.

Copia Automation: Bridging the Gap with Industrial DevOps

Copia Automation's Industrial DevOps platform is purpose-built to address the unique challenges of PLC code development, empowering design engineers to work smarter, not harder.

Key Features and Benefits:

Centralized Version Control for PLC Code:

- Copia provides a secure and scalable repository for all PLC code, enabling seamless version control and collaboration.
- It handles binary files with ease, rendering changes for clear and intuitive visual code comparison.
- Engineers can effortlessly track changes, revert to previous versions, and ensure code integrity.

Streamlined Collaboration and Code Reviews:

- Copia facilitates real-time collaboration, enabling teams to work together on code development and reviews.
- Integrated markup tools and issue tracking simplify the feedback process.
- Branching allows for safe and efficient development of new features.
- Copia provides a centralized hub for design engineers and on-site teams to collaborate seamlessly. With features like:

Copia Automation's Industrial DevOps platform is purpose-built to address the unique challenges of PLC code development, empowering design engineers to work smarter, not harder.



- **Real-time code sharing and version control:** Everyone works on the latest version, eliminating confusion and ensuring consistency.
- **Integrated markup tools and issue tracking:** On-site teams can provide precise feedback directly within the platform, streamlining the review process.
- **Built-in communication channels:** Engineers and on-site personnel can communicate directly within the platform, ensuring clear and efficient communication.
- **Role-based access control:** Control who can view, edit, and approve code changes, ensuring security and compliance.

Automated Change Management and Auditing:

- Copia automates the process of implementing updates and bug fixes across multiple projects.
- Detailed audit trails provide complete visibility into code changes, ensuring compliance and traceability.
- The ability to compare versions side-by-side, even with binary files, is a powerful tool for analysis and troubleshooting.

Enhanced Visibility and Insights:

- Copia provides a comprehensive view of the entire PLC code lifecycle, from development to deployment.
- Data-driven insights help engineers identify potential issues and optimize code performance.

AI-Powered Productivity Tools:

- Copia leverages AI to interpret, summarize, write, and document code.
- This supports onboarding, knowledge transfer and sharing, and frees up more experienced engineers to focus on the complex and creative tasks.



Library and Project Management:

- Copia enables the management of code libraries and the seamless integration of those libraries into projects.
- This allows for code reuse, standardization, and efficient knowledge transfer.
- Copia allows for pushing code changes back to the library and then propagating those changes to other projects, ensuring consistency and reducing rework.

The Path to Industrial DevOps: Transforming PLC Code Development

By adopting Copia Automation's platform, design engineers can:

- **Reduce development time and costs:** Streamline workflows, minimize errors, and accelerate project delivery. As Seepex's Head of Electrical Engineering, Dr. Sebastian Rickers, notes, "We have now sold significantly more units that we would not have been able to sell if we did not have Copia." This highlights the direct impact of Copia on business growth and efficiency.
- **Improve code quality and reliability:** Enhance collaboration, enforce best practices, and ensure code integrity.
- **Enhance collaboration and communication:** Break down silos, foster teamwork, and facilitate knowledge sharing. Copia fosters a culture of collaboration between design engineers and on-site teams. This leads to faster iteration cycles, reduced rework, and improved code quality. By working together more effectively, teams can deliver projects on time and within budget, while ensuring the final product meets the needs of all stakeholders.
- **Increase visibility and control over PLC code:** Gain a comprehensive view of the code lifecycle and track changes with ease.

By working together more effectively, teams can deliver projects on time and within budget, while ensuring the final product meets the needs of all stakeholders.



- **Drive innovation and efficiency in industrial automation:** Focus on strategic initiatives and leverage AI-powered tools to optimize processes.
- **Mitigate Cybersecurity Risks:** Implement Industrial DevOps practices to improve code security, reduce vulnerabilities, and address the fact that cybersecurity breaches are the #1 cause of unplanned downtime, as highlighted in [The State of Industrial DevOps Report](#).
- **Empower the Workforce:** Provide employees with better tools and processes, leading to increased productivity, job satisfaction, and improved knowledge sharing, aligning with the report's finding that 97% of respondents believe their team would benefit from Industrial DevOps.

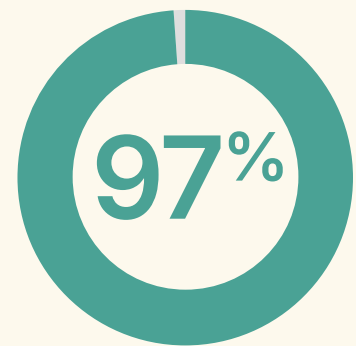
Conclusion

The challenges faced by design engineers in the PLC world are real, but they are not insurmountable. Copia Automation's Industrial DevOps platform offers a transformative solution, empowering engineers to overcome these obstacles and unlock new levels of productivity, efficiency, and innovation. By embracing Copia, design engineers can embrace the future of industrial automation and drive their organizations towards success.

Take the Next Step in Your Journey

Don't let outdated tools and processes hold you back. Discover how Copia Automation can revolutionize your PLC code development workflow. Contact us today for a [personalized demo](#) and embark on your journey towards Industrial DevOps.

You can also reach out directly by emailing contact@copia.io.



Respondents who believe
their team would benefit
from Industrial DevOps

