Effective Data Management
in Automated Production

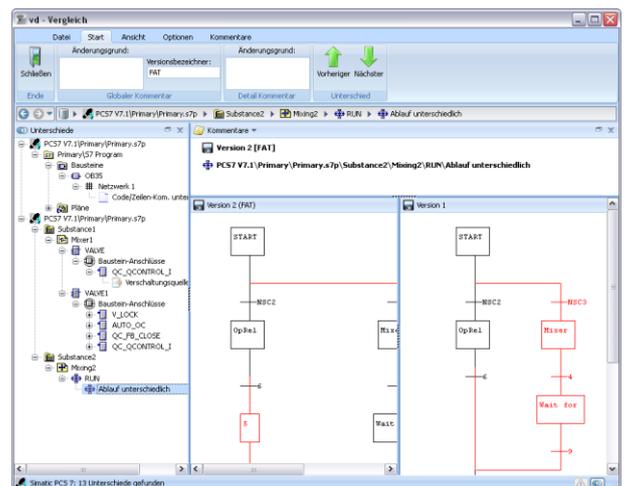# Who changed what, where, when and why?

In the field of automated production, the higher the level of automation, the more important it is to precisely coordinate all elements involved in the process. And, of course, this is not just true when commissioning a new line. It is equally important during ongoing production. Because processes need to be continually changed and optimised in response to new specifications or to meet revised quantity, productivity and efficiency requirements.

Making a change to a process is something that has to be done with care. When any machine or controller is reprogrammed it means making changes to the project. And it is vital to keep track of every single change.

Challenge number one: Which is the most recent version?

In ongoing project development, you need to be absolutely certain that you are working on the most recent version. And when you have made your changes, you need to be absolutely certain that your altered version is now recognised by everyone as the new most recent version. That sounds simple, but in the real world of production there are many reasons why it is not:

- There are usually quite a few people working on the maintenance and development of a production process. The files used by all of them must always be up to date. Ensuring that this is the case is a difficult job, especially when shift work is involved.

- In practice, not all changes are going to work straight away exactly as planned. When part of complex production sequences, they need to be validated before they are released. So the process of making a change can take some time.

- Often it is necessary to make several changes to a program simultaneously. And often there are different developers responsible for different areas. When all the individual changes are put together, great care needs to be taken to ensure that nothing gets accidentally overwritten. Not keeping precise track of versions in this situation can result in a complex tangle of errors.

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- As soon as a new version is released, it is important that all devices that are going to use it are updated without delay. In the real world of distractions and interruptions, this may or may not happen the way it should. The problem then becomes how to be absolutely certain that all devices actually are running the latest software.

Challenge number two: Documentation

Changes to the production process need to be reliably tracked so that the change progression is always clear, comprehensible and easy to follow. To guarantee this, it is necessary to document when, why and by whom each change is made. Once again, we have something that sounds so simple but is deceptively difficult to put into practice. One of the main reasons for this is that documentation is often not so much seen as an integral part of the program change, but as a bit of a chore. Although everyone knows and agrees that it should be done, actually doing it is made more difficult by the following factors:

- The documentation of a program change is often done after a considerable delay
- Time pressure
- The person making the change thinks that it is obvious and self-explanatory
- Lack of appreciation of what is important for other people to know
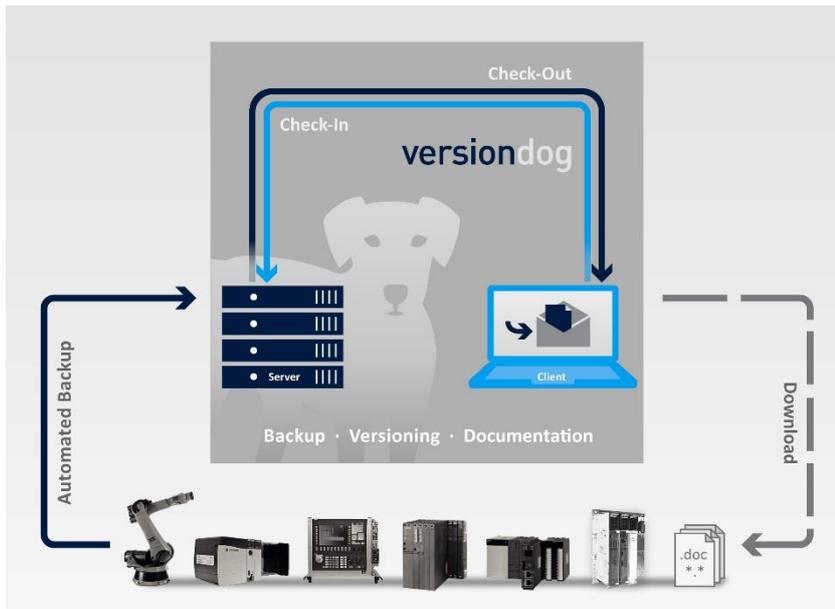
Bridging the gap between Information Technology (IT) and Operational Technology (OT) – a hot topic in manufacturing

Challenge number three: Monitoring production

A production process can only meet the specified levels of quality and productivity if the parameters and programs of all involved automation devices are at all times those that have been most recently released. There can only be one most recently released software version for each device, and all devices need to be running it. Straightforward though this may sound, the challenge lies in being able to answer the following questions:

- Given that it is not enough to simply assume that the version of a project currently running on a controller is the version that is supposed to be running on it, how can we be certain that it is?

- If there is a difference between the software on a device and the latest version of the project, then how can we identify what changes were made? Exactly how many changes were made, and precisely what are the expected effects of each of them on the production process itself?

- Where a change has had a detrimental effect on a process, the questions are: How long has this change resided on the controller? Was there a loss of product quality? Who made the change and why?

- Where a change has made a significant improvement to a process, has the improved software been downloaded to all relevant controllers?

It is not until the above questions can be answered with no doubt whatsoever that the following statements can be made about a given production process:
- The most recent version of the project is known, therefore disaster recovery can be carried out at any time with the minimum of downtime.

- Any member of staff is able to analyse the process; the documentation contains all the information necessary to know which changes have been successful; these changes can be integrated into the project with the certainty that they will result in an improvement.

Requirements for a data management system

A data management system for automated production needs to respond effectively to each of the above challenges. To do so, the system must include the following:

- The most recent version of all production-related projects must be centrally available and easily identifiable

- A version history with no gaps must be recorded

- Staff must be guided by the system toward complete documentation of all project changes

- Who changed what, where, when and why must always be clear

- It must be possible to compare any versions all the way back to the base version (lifecycle management)

- There must be a way of ensuring that the operational program running on a controller corresponds to the most recent version of the project

- If disaster recovery is required, the system must make it possible to quickly restore the device software to exactly the state it was in immediately before the problem occurred

A software-based solution

Now that we have a good summary of the 'must haves' for a state-of-the-art change management system, we can consider how the package should be rounded off. Any software-based solution needs to make usability a priority. It is much quicker to train people to use intuitive software, and it is more efficient to work with. That saves company time. As does the use of automation where tedious and repetitive manual processes are not only an inefficient use of manpower but also a source of errors. AUVESY's software and data management solution versiondog does all of the above and more. It can make a significant contribution toward sustained cost-efficiency in production, toward the optimisation of production processes, and toward ensuring that valuable control software is rigorously managed and safely backed up. Confirmation of that can be found wherever this solution is in use – all over the world and in all branches of automated production.

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