

**Excellent Communication for Effective
Production Processes in the F&B Industry**

zenon Network Technology



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Networks in F&B automation at a glance

Companies in the food & beverage sector have to overcome major challenges. High demands for quality are combined with time pressure, strict regulatory requirements and constantly changing products. Therefore, it is important to work effectively and efficiently; minimize errors, communicate as clearly and directly as possible, react quickly to each event and cope with hardware breakdowns; with minimum disturbance to manufacturing production.

SCADA/HMI software in the production facilities and between production and the IT infrastructure in F&B factories must therefore be able to satisfy many different requirements:

- **Integration:** Different types of machines should work together without problems. The automation hardware and software embedded in production facilities, which often comes from different manufacturers, must also work with each other. The SCADA/HMI system used must ensure reliable connection to all these systems – to transparently integrate them.
- **Communication:** The SCADA/HMI software has to be flexible on the higher levels of the automation architecture and integrate into the dynamic environment of the F&B sector. This also includes adding new software users, both at monitoring and management level, as well as integrating new systems that are to be used to communicate with the existing SCADA/HMI software.
- **Expansibility:** Implementation of these expansions to the SCADA/HMI system should also be carried out cost-effectively.

If machines and organizational levels are networked, the company benefits from:

- ✓ Fast exchange of information
- ✓ Use of all data in all systems
- ✓ Overview and reaction in real time, in time
- ✓ A single system that is shared by all users, with a single information base

Because F&B has very sensitive production areas, the networking must be simple and safe, in compliance with all international norms, and must increase system performance.

Why network?

Effective communication is always multidimensional; this is also true for automation. Anybody who communicates only in one direction (from the control panel to the machine) or only on one level (within the process control system) sacrifices valuable knowledge, productive shared information and performance; ultimately therefore sacrificing resources, opportunities and money.

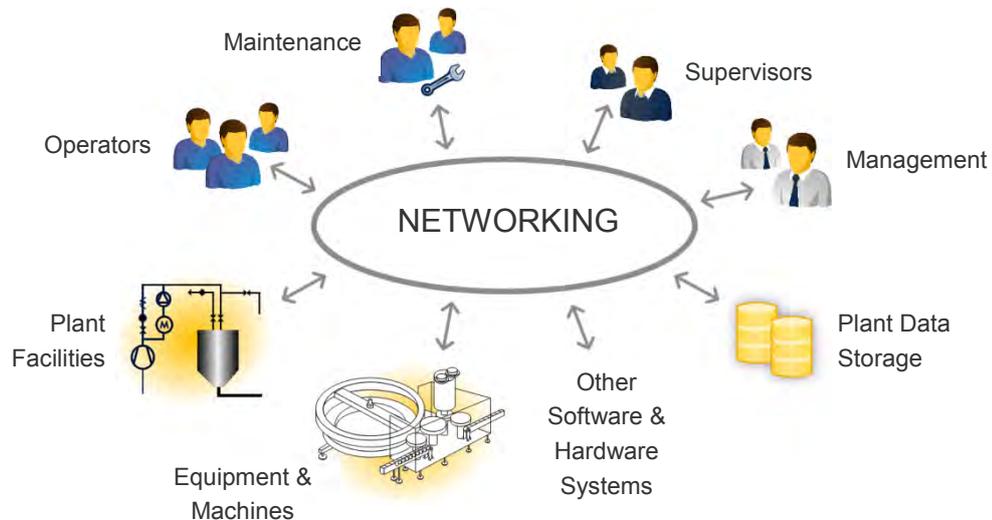


Figure 1: Plant networking offers proper communication infrastructure for operational and management tasks, as well as for process and plant automation.

Intelligently networked automation enables data to be used everywhere, and provides the ability to react quickly, flexibly and productively.

Five good reasons for networking in F&B automation:

1. The capability to know about 'everything, everywhere', both at factory level and management level, and thus to optimize your process as a whole
2. Recognizing interrelationships and thus increase overall effectiveness (detailed cause and effect)
3. Security of data through redundancy
4. Automatic reports instead of hand-written lists, thus free of errors and with increased efficiency
5. Integration of production with company management (ERP)

What argues against networking? ...When programs require expert knowledge of network structures, instead of being easy to configure; people working on the project should be focusing on the automation, not on network programming. Therefore Networking has to be automatic and easy.

zenon: Delivering the best requirements for smart networking

There are a number of good reasons to network processes with zenon. The four most important are:

1. Existing base of HMIs:

At the moment, the top three machine building companies, as well as many smaller companies in F&B packaging supply their machines with zenon. zenon can directly integrate as a supervisory SCADA for all the machines on which zenon runs as an HMI, with complete access to pictures, variables, values, trends, etc.

2. Over 300 connectors to PLC's:

zenon can connect to virtually all types of machines in use. Should another HMI run on a machine, zenon can connect directly to the PLC and obtain data directly – without intervention into the HMI by the integrator or such diversions as OPC. This means: simpler, more direct and more reliable access to all data. If the data is in the system, it can be used as desired.

3. In general, many different systems are in use within a company:

zenon is open, so it can exchange data, connect to them or integrate them: SAP, MS Office, management information systems (MIS), production planning, QA and reporting – integrated simply and reliably.

4. Diverse devices:

Whether the control panel for central control of all facilities, a PDA for key figures or maintenance tasks, CE terminals at the machines or web servers for home office and management – zenon is completely integrated everywhere.

From a plan to optimized facilities

Highly effective and efficient automation in the F&B sector is a challenge that can only be realized with a structured approach.

Four stages lead from the plan to optimized facilities:

1. Comprehensive design concept for machine operation, monitoring of facilities and operational administration
2. Client/server architecture for an automation network that is as dynamic as that of the F&B market itself
3. Highest level of availability through easily-configured redundancy
4. Optimization of the facility's operation through horizontal transparency

1. A comprehensive concept for machine operation, monitoring of facilities and operational management

The complex network relationships of an F&B factory often at first glance appear to be as complicated as in figure 2. However, a clear structure, as can be created in zenon by 'drag and drop', makes the planning of complex facilities clear and logical, but most importantly it is significantly faster.

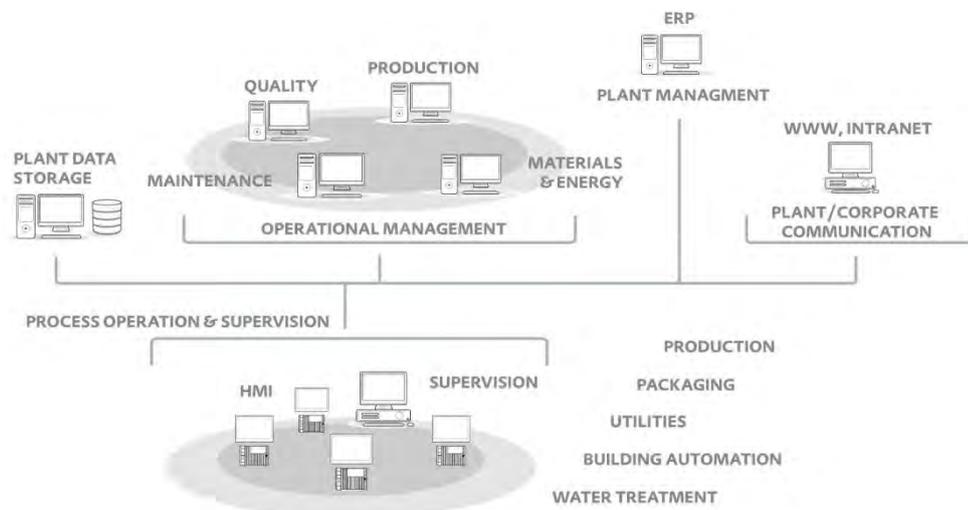


Figure 2: The whole production entity; made real, with seamless connectivity and integration.

In zenon, a project is a unit of individual components with a clear object-oriented structure. If an individual panel or an individual PC is used for automation, an individual zenon project provides all the functions for real time operation and historic evaluation. zenon archives data, takes care of alarms and events, displays relevant process trends and much more.

However, a project can also use and provide the many advantages of a clearly structured network. It can be organized hierarchically in relation to other projects

and can thus prepare information and functionality in the whole network and considerably increase the flexibility of the facility. zenon network technology is designed in such a way that no special knowledge in administration of IT networks is necessary. With just a few settings, it is defined which project information and functionality is provided in the network and which projects use these.

zenon network – from the point of view of system integrators

Complex network structures can be created logically step-by-step in zenon. For example, a packaging facility: in the first stage, the HMI projects are created on the individual machines. These are integrated hierarchically in the superordinated project to monitor the facilities. Then, this project is integrated into the next level up, operational administration. This results in two things:

1. All information from factory level such as variables, alarms, events, etc. are always available to all other levels.
2. All windows and functions that were created in HMI or monitoring functions are also available at the level of operational management.

This project structure can be easily created in the zenon Editor by drag & drop. The finished projects are sent to the relevant hardware directly via the network. As soon as the application is started, the zenon network is ready for operation.

All versions of zenon from 6.20 SP4 can be used concurrently in the same network without restrictions. Software updates therefore never need to be carried out on all panels and PCs at the same time, but can be instead carried out selectively. The large diversity of integrated drivers and interfaces also makes it very easy to operate a heterogenic automation system in the network, because zenon also integrates other software systems horizontally into the network.

zenon network – from the point of view of F&B companies

zenon network technology equips all levels of a company with a complete communication structure, from factory level to the board room. This:

- ✓ simplifies factory operation and enables continuous step-by-step improvements
- ✓ reduces the time required for integration tasks through simple configuration of the network and reusability of projects in the network; together with one-click-deployment and online downloading
- ✓ opens new possibilities for increased flexibility and dynamism

2. Client/Server architecture for an automation system as dynamic as the F&B market is itself

Modern production is dynamic and subject to constant changes. A network must not only adapt to this situation, it must promote the company's ability also to be dynamic. Production in the F&B sector does not stay the same. The requirements of the market change and new products and standards are introduced which lead

to continually changing requirements for production facilities and automation systems. A typical requirement is to provide appropriate production information to the proper persons in the network.

For instance, it can be necessary to give several members of the production team access to the alarm administration or permanent access to analyze the system performance. The SCADA/HMI systems differ here; many require additional communication channels between production and IT systems for this step, because the machine operators or quality testers have to input data into the system manually. zenon, in contrast, offers complete support for such expansion as standard and therefore keeps investment costs low.

As soon as the respective information or function is available in the network, it can be provided very easily to other employees via the zenon client/server function. Therefore each piece of hardware that can communicate via the network can be used, irrespective of whether it is a touch panel PC or a PDA connected to the network by a WLAN. A practical example of this is providing a mobile maintenance team with information necessary to prioritize tasks in good time; or the person responsible for the performance of the packaging equipment always has the most important indicators available on his PDA, even if he is moving between machines.

Client/server – from the point of view of system integrators

A project's server is defined through the network settings in zenon Editor. If the same project is started on another machine, zenon automatically recognizes that the machine is not the server and starts the project as a client. The client then synchronizes itself automatically with the server. During the integration phase, additional benefits of the automatic project updates take effect. Namely, changes must be made on the server and zenon then automatically completely updates the clients.

Client/server – from the point of view of F&B companies

The use of the zenon client/server function leads to:

- ✓ flexible, cost-effective communication for the whole production team via intranet or internet
- ✓ increased overall effectiveness and quality by means of quick reactions to events in the production facilities

3. Increased availability through redundancy

In figure 3, zenon takes over the specific HMI tasks for the operation of the machines in a packaging facility. Furthermore, zenon runs on a PC to monitor the facilities. The zenon network technology allows the simple integration of the redundancy functionality of the HMIs directly into the SCADA level.

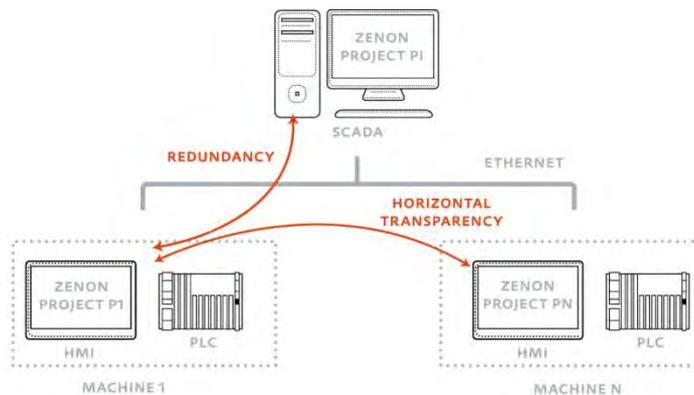


Figure 3: Increased availability through redundancy

If the operating panel of a machine breaks down, production usually comes to a standstill – with all negative effects on the availability of the whole packaging facility. But in the architecture described here, the standby PC assumes all HMI functions without data being lost or production having to be stopped. The failure becomes non-critical.

Redundancy – from the point of view of system integrators

Redundancy is activated in zenon in only four steps:

1. HMI projects are defined as network projects.
2. The HMI projects are designed as sub-projects of the SCADA project in a hierarchical structure.
3. The HMI projects become redundant projects in that a server and a standby server are defined.
4. It is established whether variables should be calculated locally or in the network.

Redundancy – from the point of view of F&B companies

Redundant networks with zenon ensure that all of the information from the machines is automatically available for monitoring. This concerns every individual measured value as well as all parameters, alarms, event and graphical illustrations for process visualization. Thus

- ✓ the availability of machines and the whole packaging facility is increased
- ✓ the time required for integration tasks at SCADA level is reduced, because all information from the machines is automatically provided at the monitoring level

4. Optimization of operation of the facility through horizontal transparency

In figure 3, we have seen how zenon HMI projects are networked with SCADA applications on a PC. Even if no redundancy is used, zenon provides further important functionality for increased performance gains: horizontal transparency.

There are clear goals for production processes in a packaging facility, for example the continual improvement of performance, as described in an Overall Equipment Effectiveness (OEE) approach. This requires a synchronized interaction of machines and operators, in order to reduce downtime and minor breakdowns.

However, a machine operator is often not involved just with his own machine. But often he does not know much about other machines or about the whole packaging facility's performance goals. With zenon the machine operators have access to information on other machines and an overview of the whole packaging facility via zenon networking technology.



Figure 4: zenon networking technology brings overview of the whole production facility

In this way, each operator can plan a pause of his machine better in relation to the status of other machines. If each user is informed of the current performance indicator values, the whole production team can concentrate better on joint goals.

Horizontal transparency – from the point of view of system integrators

Using the zenon editor, the variables of other networked projects can be accessed from each HMI project. All information on variables is available in the process, according to which level of detail is required. The variables of each machine can also be displayed on the HMI of another machine.

Horizontal transparency – from the point of view of F&B companies

Horizontal transparency ensures increased performance in the operating facilities thanks to:

- ✓ better information, integration and cooperation between machine operators
- ✓ communication of actual values and target values of performance indicators
- ✓ quick integration thanks to the zenon network technology functionality - included as standard.

Conclusion: zenon in the F&B sector

The F&B sector is always under pressure to increase productivity and reduce costs. With zenon from COPA-DATA, these goals can be achieved by optimizing existing resources.

zenon is very able to meet the diverse requirements of the F&B sector. From the start, when the zenon automation system was designed, great value was placed on openness and the ability to integrate into the process, both horizontally as well as vertically. Therefore information can be provided to the whole facility. zenon connects to the most varied machines by connecting directly using its own tailor-made and efficient drivers.

A particular characteristic of zenon is its ability to provide projects in the network efficiently and in a way that is easy to administer. For example: as soon as a zenon project is completed, its functionality is provided to all users via the network, without the project having to be reworked. Although the technology is highly developed, the application development with zenon always remains very open, accessible and easy to operate.

Companies can also illustrate complex facility structures clearly and effectively with zenon. At the same time, they reduce work and costs because zenon provides simple and secure configuration dialogues. But zenon itself can also be integrated without much effort being required for training. In addition, zenon can be integrated safely and efficiently into existing systems and architectures thanks to its diverse interfaces, and can take on subtasks without problems just as well as the complete visualization and control of a facility.

Emilian Axinia, F&B Industry Manager at COPA-DATA will be happy to answer any questions you may have in relation to zenon: EmilianA@copadata.com.



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