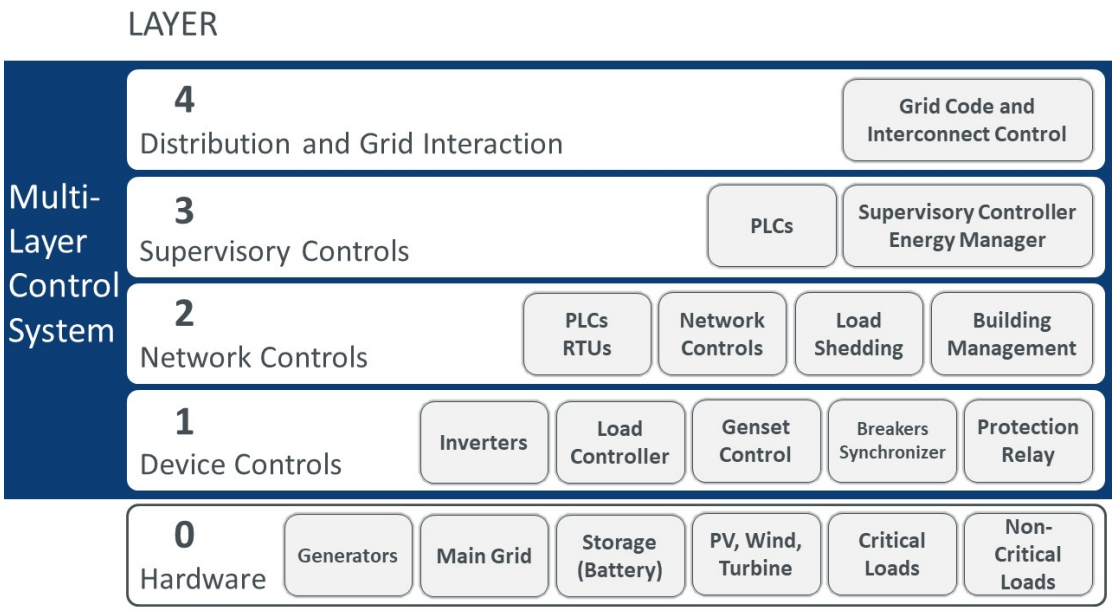
Control system philosophy - what is the best setup?

Simon - 2024-09-27 - easYgen-3000XT

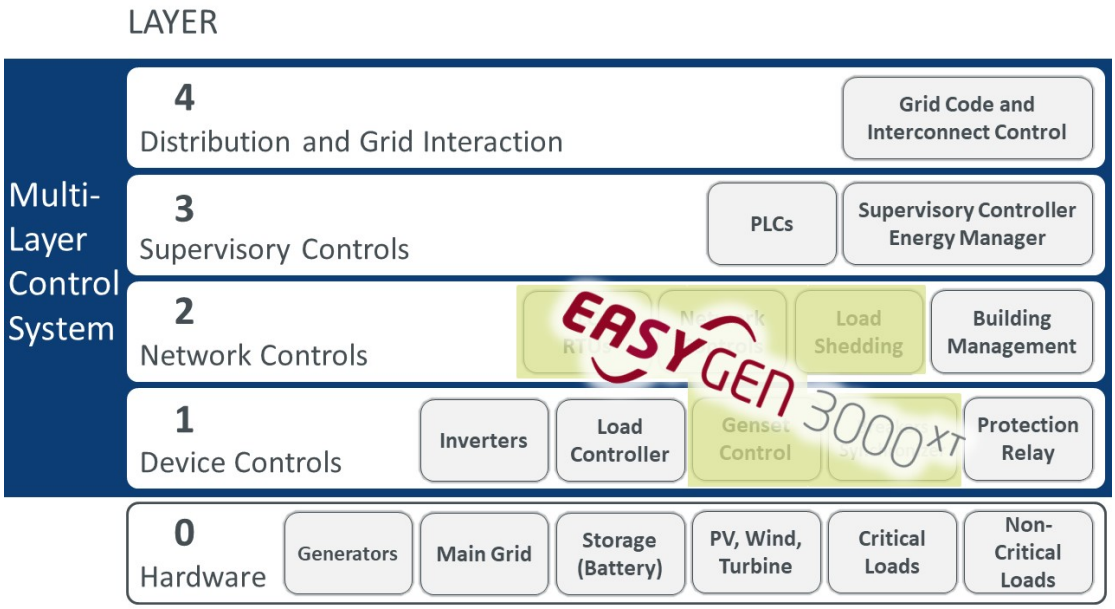
Throughout the last decades we've seen thousands of customer applications. The more complex the applications the more important the conceptual work and everything starts with a philosophy - in this article the electrical control philosophy.

The following slides were created because a customer project team questioned the control concept on a very high level. Therefore we provided our point of view, based on customer feedback, which we gathered throughout the last years. I hope you'll find this helpful as well... (the following considerations are independent of selected suppliers)

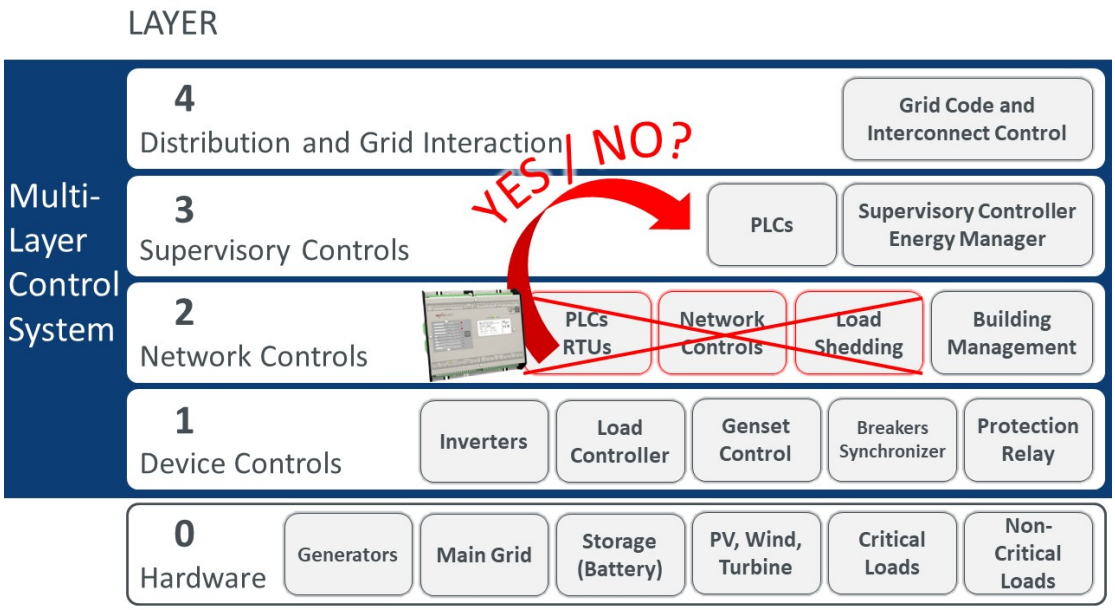
control system layers



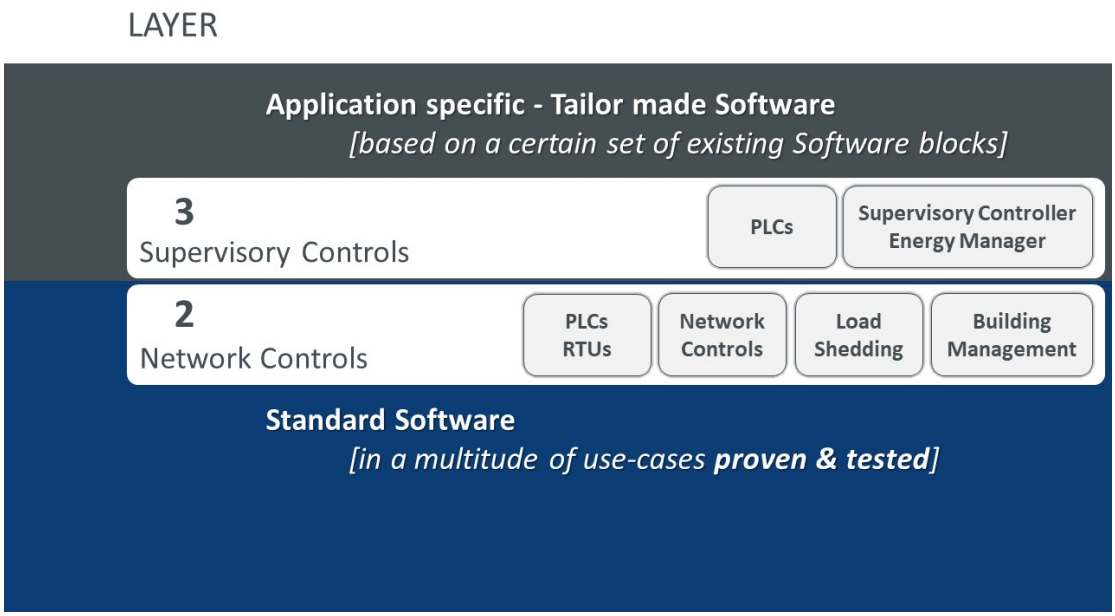
Woodward's controllers the system:



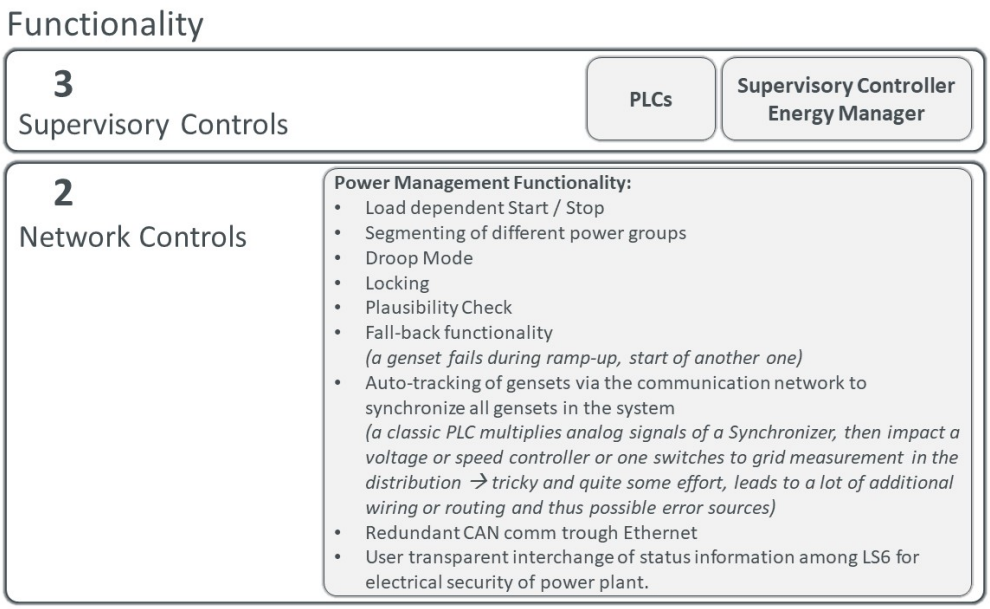
It is possible to cover a lot of functionality in Layer 3. What are the advantages and disadvantages of such an approach?

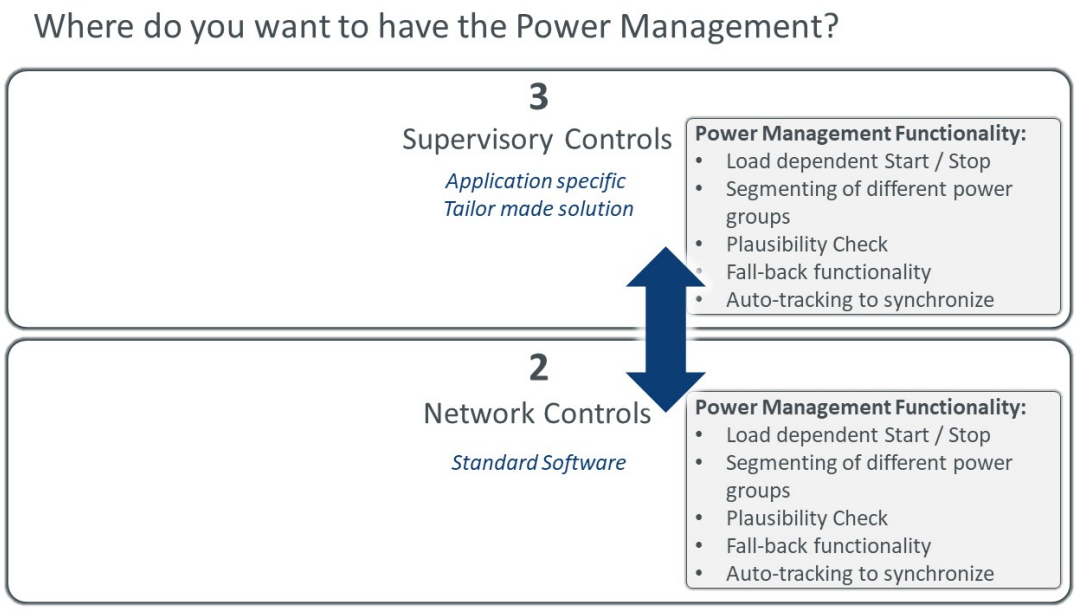


Generic & typical differences between the different Layers

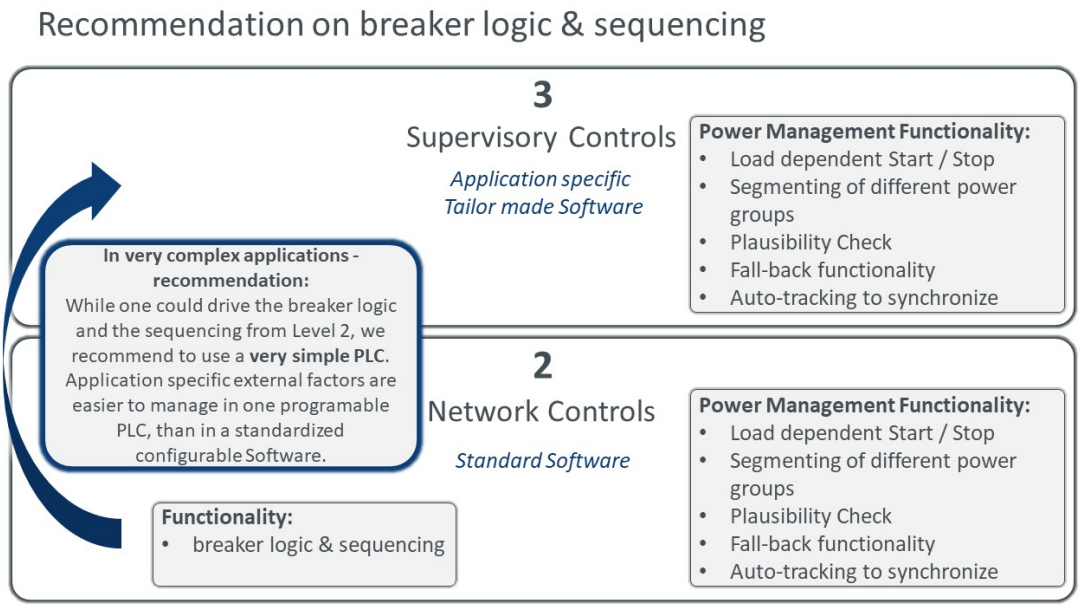


Typical functionality in Layer 2, which Woodward covers in it's controls



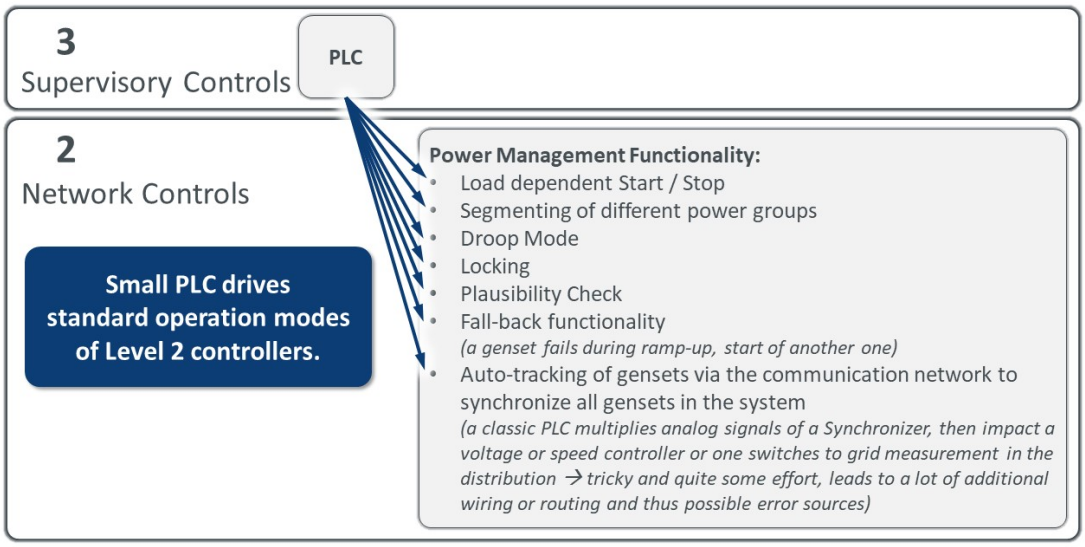


For very complex applications, it makes sense / one could consider to move the breaker logic and sequencing to Layer 3. If there are too many different factors, which would influence these scenarios.

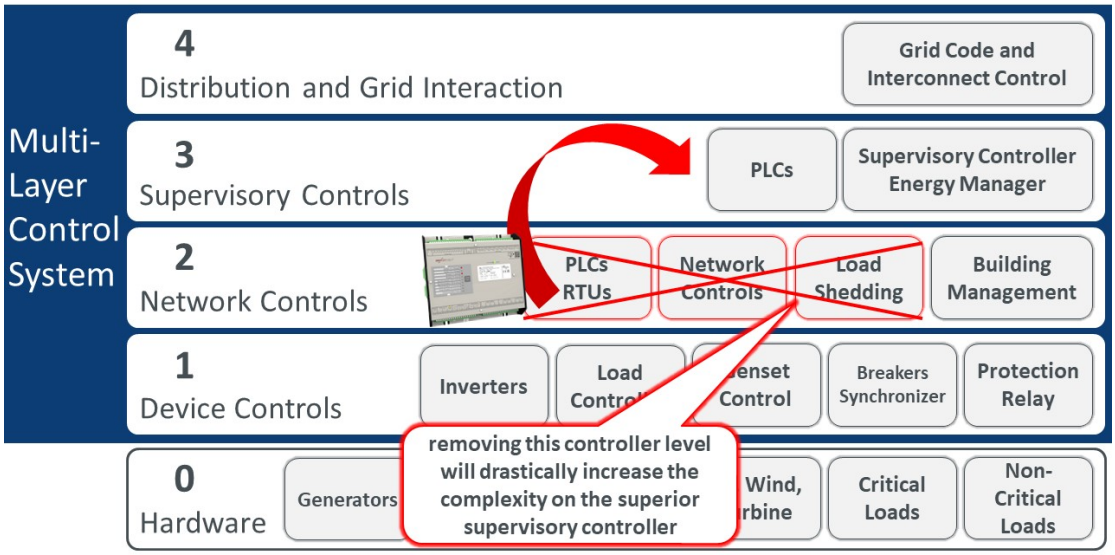


This is how it could work with a simple PLC on layer 3, which drives actions on layer 2.

Simple PLC setup



LAYER



Summary (independent of the vendor)

Supervisory controller

significantly more extensive PLC functionality

Advantages

- Less hardware
- Single point of programming & process visualization for very broad functionality
- Various automation companies available *[with different solutions approaches & know-how]*

Disadvantages

- dependence on specific PLC software supplier *[key technical person familiar with the application]*
- Extensive programming of a multitude of tailor-made application modes
- Redundant PLC required

Lean Supervisory controller

functionality in standard network controls

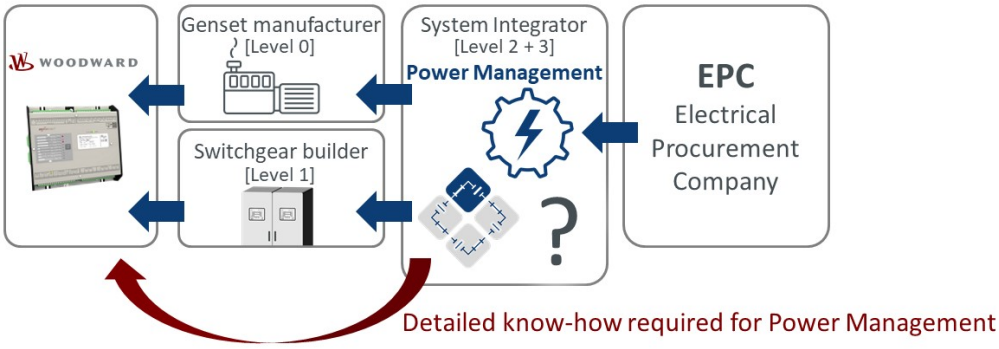
Advantages

- usually more economic, based on standard soft- & hardware
- commanding standardized application modes
- High-volume standard products
- Simulation enables a very fast & easy design process *[Woodward specific]*
- Automatically various redundancies build-in *[Multi-Mastering]*

Disadvantages

- more hardware
- change of application modes required parameter uploads to several devices

Responsibility Flow depending on Scope of Supply



The Power Management supplier is responsible for the genset control, as part of the synchronization.