

# WhitePaper

## Safe-Path Electrical Cabling ver. 1.0

*“safe and future-proof power distribution”*

Traditional electrical cabling for residential environments have a physical “bus” topology. Van Welleman Villas® decided to opt for a completely different approach based upon a physical “star-of-stars” topology. Not only this reduces the wiring resistance, it also significantly minimizes the risk for faulty contacts causing fire. On top of this, Safe Path cabling provides a fully redundant power distribution avoiding mains failure in case of fire.

The major advantage of traditional “bus”-based wiring systems is that they are cheap, and easy to install. Typically, a 2,5mm<sup>2</sup> cable runs from the technical closet (i.e. the fuse-box “α”) to the first mains outlet, then to the second, third ... until it reaches the eighth and final outlet (i.e. fig. 1).

This implies that all outlets -except the first- face an increasing electrical resistance ... but also an increased risk for faulty contacts. The problem does not rely in the resistance (since this only causes a harmless loss of tension), but in the enhanced danger for faulty contacts causing fire.

Faulty contacts generate arcs that -in turn- lead to fire. In fact, faulty contacts are one of the major reasons for fire (together with drying machines and low-tension halogen spots). One might think that once a system is tested the risk no longer exists, the reality however is that faulty contacts are created over time by daily temperature fluctuations (i.e. the thermal oscillation forcing screws to expand and contract) as well as through mechanical load due to usage.

Safe Path electrical cabling uses a completely different approach based upon a “star-of-stars” topology (see column right). The following measures increase electrical safety, fire safety, and mains redundancy :

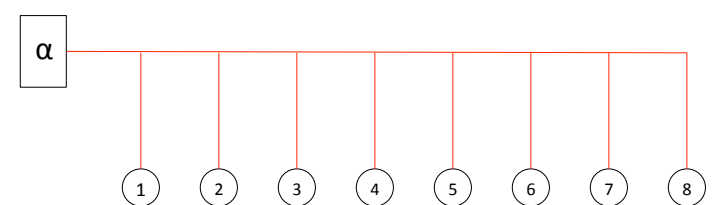
- First, two groups of four outlets (1-4 and 5-8) are used instead of one group of eight outlets.
- Second, all outlets are connected directly to an intermediate node (i.e. “Ω”) with individual 2,5mm<sup>2</sup> cables.
- Third, all connections use spring-contacts based terminal blocks instead of screw-based junctions.
- Fourth, each node (i.e. “Ω”) is connected to the technical closet (i.e. “α”) with two 2,5mm<sup>2</sup> cables.
- Finally, cables follow different paths towards the two nodes. Should there be a fire in a technical duct, then only half of the outlets will be affected (see fig. 2).

All of the measures above lead to electrical systems with better protection against fire, damage and assault (fig. 3).

Finally, all our technical closets are equipped with multiple Arcing Fault detection systems to provide our customers with ultimate electrical and fire safety.

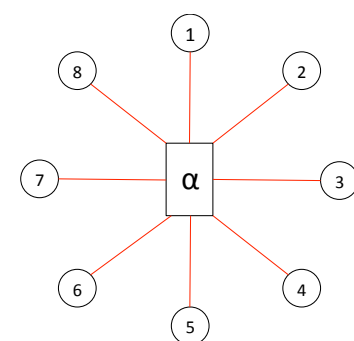
### Physical Bus topology

In a physical bus topology (i.e. form, architecture) all components are connected to each-other. The first to the second, to the third, to the fourth ...



### Physical Star topology

In a physical star topology all components are connected to a central “node” (α).



### Physical Star-of-Stars topology

In a physical star-of-stars topology all components are connected to a node “Ω” (also referred to as a satellite) which in-turn is connected to a central node (α).

