1588 Grandmaster – Why Care About Your Engine?

Packet engine enhancements have great broad-based impact on timing.

I never thought of a car and a precise time grandmaster device as having any type of commonality. But the growing trend and demand for electric cars places new emphasis on the types of engines these vehicle designers increasingly are moving toward. And with it, the topic of transitioning older vehicles from gas engines to battery powered also is being discussed. For instance, this vintage Citroen DS recently was “electrified.”

Of course, it’s easier to buy a brand-new electric car like the one shown below!

This is the same dilemma facing operators of critical infrastructure networks and services, such as 5G mobile, utilities, transportation and other types of communication networks that require precise timing.

The question these providers are now asking is, “Do I have to keep buying new grandmasters or do I need to invest in a major hardware revamp of my deployment to increase capacity, performance, security and reliability?”

The answer is that there is a simpler, painless and very effective way of providing these benefits – and it’s achieved via a software upgrade. Since grandmasters at the core are based on packet-based protocols (IEEE 1588, NTP), the key is the quality of the little-discussed but very critical packet engine.

Microchip’s TimeProvider® 4100 Release 2.3 is the result of a software investment to redesign its packet engine. This is a major software project – and the good news is from the user’s standpoint, the benefits of this redesign can be leveraged by a firmware upgrade.

So, what benefits can be derived from this new, enhanced redesigned packet engine?

The most direct and obvious benefit of the new packet engine is to enable increased capacity. Many operators have adopted the G.8275.1 profile for IEEE 1588, which is multicast and relies on boundary clock support for most of the network path. This leads to architectures where each grandmaster only needs to support a low number of clients (typically base stations). However, a share of the market still favors the G.8275.2 profile for IEEE 1588 where supporting many clients is required. There are also specific use cases and markets such as data centers where many unicast clients are required, typically one thousand or more.

TimeProvider 4100 coined the term “gateway clock” in the industry to describe a grandmaster device that provides flexibility with the types and number of input and output ports to serve legacy and new deployments. The enhanced packet engine enables further flexibility by allowing more capabilities and combinations at the port level.

For example, one key requirement is support for two server IEEE 1588 Precision Time Protocol (PTP) profiles, plus up to three client profiles on the same port, on the main unit. TimeProvider 4100 features many Ethernet ports both on the main unit and with its optional expansion module with 1GbE and 10GbE support. As a result, in many cases operators can deploy the PTP profiles needed for their selected architecture by using one profile per port. However, network engineering for precise timing often leads to use cases where the grandmaster needs to serve many nodes, especially at the aggregation layer. This leads to an increased need to maximize the use of each Ethernet port and to support two server PTP profiles on the same port. This allows operators to avoid investment in an optional expansion module for additional Ethernet capacity. And, it also

allows operators to serve different parts of their network deployment, which often includes both G.8275.1 and G.8275.2 IEEE 1588 profiles on different segments of the deployment.

Some operators wish to benefit from multiple functionalities on the same port. One key requirement is to be able to support the IEEE 1588 server and IEEE 1588 client as well as management capabilities – all on the same port.

More capacity, more flexibility with more profiles per port and more functionality by supporting multiple capabilities on the same port are all the result of a more powerful and redesigned packet engine.

Deploy all your precise time and phase requirements with the same TimeProvider 4100 technology – to ensure performance, accuracy and precision using proven timing technology in operation around the world. Look for the new 2.3 firmware release and simply upgrade to this new version without any hardware change – and without buying new devices. The new packet engine has many benefits and none of the investment costs.