USE CASE
Precision Time Synchronization

APS Networks

Why Precision Time Synchronization is important!

So, why is Precision Time Synchronization important for enterprises and data center networks? At APS Networks, we believe that PTP will become the global standard for maintaining accurate time in computer networks, whether it's for the Media and Broadcast industry, Telecommunications, or Data Center, precision time synchronization is critical for performance and security.

Existing and next generation applications like online gaming, business video conferencing or AI data processing will all require network infrastructure that is synchronised. From today's video conference calls to the new possibilities with remote work and collaboration, PTP has demonstrated significant benefits in efficiency of processing and network utilisation. Moreover, PTP is expected to be foundational for many products and services in the Hyperscaler networks, including the metaverse.

Modern Data Center's contain hundreds of servers to process varied and complex applications. The common thing that all these systems and applications share is time synchronization. Since there is a diverse need for time synchronization across different industries, driven from different use cases and applications, managing the needs of this industry chain becomes a challenge. Ensuring that these servers all operate in sync is vital for the efficient performance of the networks but also the server, operating system and application.

In mobile networks, time synchronization has always been important. Each new generation of mobile networks has driven the need for increased precision and accuracy in synchronization standards and solutions. Nevertheless, 5G is different. 5G time synchronization requirements are the most demanding seen to date and have elevated the importance of time synchronization and the need for more accurate solutions.

It is 5G requirements to support Ultra-Reliable Low-Latency Communications (URLLC) services, which are driving the need for greater timing accuracy. The 5G vision of new revenue generating services like autonomous vehicle connectivity and eHealth services are simply not possible without highly accurate and reliable time synchronization. Even services like Industrial Internet of Things (IioT), Industry4.0 and other industrial automation services require reliable time synchronization.

5G is an entirely packet-based network from the core to the antenna. The challenge for 5G networks is how to provide ultra-reliable and highly accurate time synchronization over the 5G packet network.

The answer is an APS Networks PTP enabled Ethernet Switch!

Precison Time at APS Networks

At APS Networks and in conjunction with our design partners, we strive to identify how system design impacts our customer requirements. This is why we have designed our purpose built **Time Synchronization Solution** used within our programmable switches.

The APS Networks hardware 1-step synchronization solution enables PTP and SyncE functionality to provide highly accurate timing across the network infrastructure.
The APS Networks Time Synchronization solution is easy to configure and use with the standard telecom, broadcast and default PTP profiles. Our 1-step hardware design ensures that PTP processing does not impact our network switch performance.

Why our customers use the power of P4 and PTP

Below are two customer testimonials of how the APS Networks PTP solution is deployed.

● Private Wireless (5G) Solution

"We use Precision Time Protocol (PTP) to synchronize our network of switches, servers, and wireless devices to a highly precise time standard. This synchronization is crucial for maintaining the accuracy and efficiency of our systems. PTP ensures that all devices in our network operate on the same time reference, which is essential for various applications requiring precise timing. This includes encryption, where synchronized timing is vital for generating and verifying cryptographic keys. Additionally, PTP plays a significant role in Time of Flight (ToF) position tracking, enabling us to accurately determine the distance and location of objects or devices by measuring the time it takes for a signal to travel to them and back.

Furthermore, PTP is invaluable for packet engagement correlation. By ensuring that all devices in our network are perfectly synchronized, we can accurately correlate packets and data flows, enhancing our ability to monitor, analyze, and troubleshoot network performance. This is particularly important for maintaining the integrity and reliability of our systems, especially in environments where precise timing is critical. Overall, the use of PTP improves the security and accuracy of our operations and supports advanced tracking and analytical capabilities, contributing to the overall efficiency and effectiveness of our network infrastructure."

● Media & Broadcast

"Changing to an IP network infrastructure brings with it many challenges but also many benefits. IP networks are unaware of the actual video content traversing through it but using programmable network technologies, we are able to provision advanced network telemetry, additional security but most importantly clean video switching at scale and high speed across the entire network.

Most importantly, having highly accurate time synchronization across the network infrastructure ensures that all systems are working in sync so when we switch between cameras or production environments, the SDN controllers can manage how the IP streams are seamlessly switched between each other.

Using the APS Networks switch technology with its hardware PTP solution ensures that the PTP implementation doesn't effect the delivery of packet data where certain software PTP implementations can."

Why APS Networks?

Security by Design

Our switches are designed based on the security by design principles. We have full control of our hardware supply chains and have Software Bill of Materials (SBoMs) in place for all software used. Further security features all for use of our products in Critical National Infrastructure (CNI).

Programmability with P4

The innovative technology of the Intel Tofino chipset offers unlimited open networking possibilities by the use of P4 programming language, featuring in-band telemetry and mega scale data center switching. P4 is easy to access, it enables hardware offloading of protocols, arbitrary tagging of packets, and controlling behavior based on individual data pattern matches. The switch has a non-blocking switching capacity of 2.0 Tb/s and is capable of complex protocol processing at wire speed.

Innovative Designs

Our technologies provide the ultimate, stable and supported platform for open network innovation. And our dedicated hardware solutions are built around enabling the latest open technologies to serve vertical industry needs. Open technology enables hardware and software diversity: reducing risk and lock-in to tardy vendor roadmaps.

Made in Europe

Our switches are produced in Europe, as the final manufacturing will be done in Belgium, and most of the components are provided by European suppliers. The printed circuit boards (PCBs) come from Austria and most of the design is done in The Netherlands.

We Deliver!

Modularity

All our new models can be upgraded with a daughter board, supporting a full range of Precision Timing Protocol (PTP) profiles. For the CPU you have the choice of AC or DC power supplies with front to back (port to power) and back to frond (power to port) airflow. The PSUs are of Titanium-grade, to provide the highest possible power efficiency levels.

PTP Timing & Synchronization

Our advanced programmable switches are the first to deploy the Tofino chipset with a time synchronization function, which is an essential capacity in the field of telecommunications as well as in media and entertainment. This feature enables

Efficient Power Consumption

The switches are equipped with low-consump-tion CPUs and energy-efficient PSUs and Fans. The intelligent automatic control system recognizes and manages the operating mode to reduce the power consumption to an optimized minimum, in particular when not in use.

Certification/Traceability

APS Networks and its design partners have invested in simulation tools to augment our capabilities and our engineers have a high level of expertise in designing products that not only meet but exceed requirements in these areas and most importantly we have a track record of largely passing the first time. That saves time, avoids rework and ultimately cuts costs.

Contact our Design Experts to help you choose your switch: +31 35 689 1689