## At-A-Glance

### Environment

- European Physics Research Organization
- 150 scientific staff
- 100 technicians and engineers
- 15 petabytes of data are analyzed and processed by the organization

### Challenge

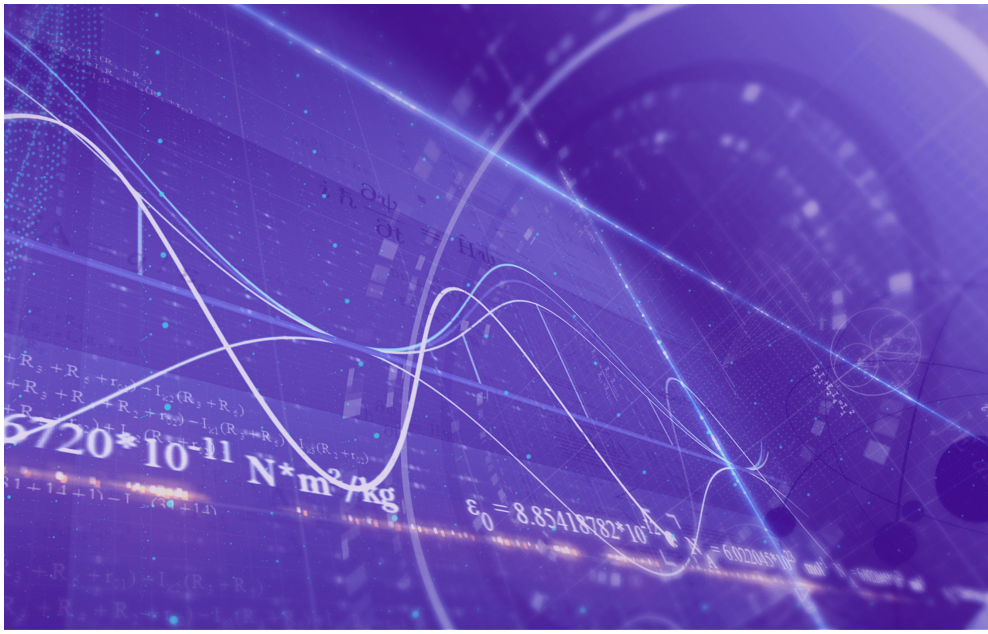
Facilitate communication, cooperation, and the exchange of data-intensive applications among researchers within a High-Performance Computing (HPC) environment

### Extreme Solution Components

- Extreme MLX Series routers at the core

### Results

- Built a reliable HPC environment capable of supporting thousands of scientists and engineers
- Gained the ability to analyze and process more than 15 petabytes of data annually
- Completed a network upgrade to 10 Gigabit Ethernet (GbE) in less than six weeks
- Increased processing and storage capabilities by up to 30 percent



# Extreme Networks Helps European Physics Research Organization Unlock the Secrets of the Universe

Despite advances made by modern technology, many scientific mysteries have yet to be fully explained, such as the nature of so-called “dark matter,” what happened shortly after the Big Bang, the origins of cosmic radiation, and what gravitational waves tell us.

These complex questions are exactly what this research organization works on every day, carrying out research in the area of astroparticle physics.

Their work has contributed to the study of the smallest particles of matter and the forces between them in the collision process within large particle accelerators. This includes helping to prepare experiments in the Large Hadron Collider (LHC) particle accelerator at the famed CERN (European Organization for Nuclear Research) facility in Geneva. In addition, they have played a significant role in the field of networking as a co-founder of the Amsterdam Internet Exchange (AMS-IX), the second-largest Internet exchange in the world (based on throughput traffic).

Following its ongoing involvement in AMS-IX, this research organization invested heavily in a globally distributed computing and storage infrastructure. In 2007, they helped launch an e-Science network Grid to support the large amounts of data that are rapidly exceeding the capacities of their current local data storage and computing environments. This project aims to create a grid infrastructure for scientific research in order to

facilitate communication, cooperation, and the exchange of data- intensive applications.

While approximately 150 scientific staff and about 100 technicians and engineers work there, its network supports the activities of many more people who rely on its computing infrastructure. “Together, they and our local partner form one of the 11 Tier-1 centers for LHC data processing. Each year, about 15 petabytes of data are analyzed and processed at our locations,” says Senior Research Scientist, Grid Computing.

Faced with this massive, growing volume of data, they needed a network upgrade that would support thousands of researchers worldwide and provide enough storage capacity, computing power, and bandwidth for future needs. The organization was also looking for IPv6 support.

## The Big Bank Theory

The European physics organization previously used core routers from Extreme Networks and enterprise edge switches from 3Com, which suited the organization at the time. But the existing edge switches were creating a bottleneck during critical data analysis—a process that requires 1 to 10 Gbps speed, but was receiving the equivalent of ADSL performance. This became the tipping point for the upgrade.

For the evaluation process, they first checked the functionality of all potential suppliers, and then looked at prices from a short list of contenders. Key requirements for the organization included virtual routing, flow control for switches, open standards, and support for large numbers of Layer 2 Virtual LANs (VLANs). After these criteria, they examined the quality of support from various vendors.

To support its bandwidth, computing, and other requirements, the research team selected Extreme MLX Series routers, which provide extremely high levels of scalability, performance, reliability, and all-important cost-saving operational efficiency.

They also added four third party 48-port edge switches, which feature advanced Layer 2 switching. The organization deployed the switches with 10 Gigabit Ethernet (GbE) modules to deliver even more bandwidth and performance.

## Conducting a Network Experiment

After a six-week testing period, the new network was rolled out and running.

The changes to the network were felt immediately as they gained enough computing capacity to support its ATLAS program at CERN. “The network is now scalable in computing and storage, and we can potentially triple the analysis throughput."

With the Extreme equipment, the research organization has had far fewer security and scaling issues, and was able to successfully roll out IPv6.

“Extreme offers high performance, reliable, industry-leading technology that allows us to support IPv6 and protect our vast amounts of data. We expect Extreme to be part of our environment for many years to come.”

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**Senior Research Scientist**

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## Making a Breakthrough Discovery

The research team expects the new routing core to be relevant for the next five to seven years. Its scalability gives them the breathing room it needs to support additional capacity.

Beyond that, they foresee a time when the group will need 100 GbE—and is confident knowing that Extreme already has the built-in flexibility to meet this demand. “The solution has been configured in a way that we can easily add a few 100 Gbps lines when we need the additional bandwidth.”