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The National Research Council of Italy, (CNR-IMAA) delivers successful network upgrade with Arista Networks

Highlights

Challenge

With demand for HPC growing, the Institute of Methodologies for Environmental Analysis successfully deployed a spine and leaf-based network from Arista Networks that has improved performance and reliability while unlocking the potential for further compute and storage expansion.

Solutions

- Arista 7000 Series spine and leaf switches for high performance, low latency and scale.
- CloudVision software delivering single view of the entire network for simplified management.

Results

- Improved network and application performance and reliability.
- Open standards-based approach to simplify support, upgrades and automation.
- Consistent Extensible Operating Systems across entire network simplifies management tasks.

The Institute of Methodologies for Environmental Analysis was struggling with a decade old network infrastructure that was limiting the potential of its growing HPC environment. In response, it selected Arista as the core of a new network that is helping to improve performance and reliability while reducing its management burden.



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Project Background

The National Research Council of Italy (CNR) is the largest Italian government research institution. CNR is organized in more than 100 institutes that perform multidisciplinary activities and one such organisation is CNR-IMAA (Institute of Methodologies for Environmental Analysis) that conducts research activity devoted to the development and the integration of satellite, airborne and ground-based "Earth Observation Technologies" with the aim of studying environmental and geophysical processes.

Challenge

The Institute is involved in over 20 projects, many of which use IT systems from its primary data centre in Tito, in the Basilicata region of Italy. CNR-IMAA is a heavy user of high-performance computing (HPC) and its infrastructure includes over 2000 core servers and over 2 petabytes of storage that are used for pioneering projects. One such example is The Aerosol, Clouds and Trace Gases Research Infrastructure (ACTRIS), a pan-European research infrastructure producing high-quality data and information on short-lived atmospheric constituents and on the processes leading to the variability of these constituents in natural and controlled atmospheres.

With increasing demand on its infrastructure, in 2019 CNR-IMAA began a project to refresh its core network which was based on an older three tier design. As Ermann Ripepi, Head of Infrastructure and Network at CNR-IMAA explains, "For our research activities, we needed to have an EVPN/VXLAN capability using a leaf and spine design to deliver the high speed and scalability within a flexible Software Defined Network architecture. This included within the data centre and from the data centre to endpoints, and these goals made up the key requirements for the project."

As part of the tendering process, CNR-IMAA considered both its incumbent network supplier of 10 years alongside several alternative solutions. Although many of the research projects are dependent on access to high performance network connectivity, the detailed evaluation of potential suppliers also focused on reliability and ease of management to aid the small IT department that is tasked with managing the growing data centre and HPC environment.

Solution

Following a 20-month evaluation period, CNR-IMAA selected Arista Networks as the core of its new network architecture. As Ripepi explains, "The Arista switching solution offered high performance, low latency and scale-out capability. We were also impressed by the CloudVision software to orchestrate and automate our network along with detailed telemetry for monitoring."

CNR also selected the Arista 7280 Series as the new edge router platform offering advanced routing capabilities, high scale throughput up to 12Tbps and deep packet buffers up to 32GB.





The Spine and Leaf switches use Arista 7050X3 Series within a 1RU system with up to 48 ports of 25G SFP and 8 ports of 100G QSFP with an overall throughput of 4Tbps or 32 ports of 100G QSFP with a throughput of 6.4Tbps. The high density SFP ports can be configured to run either at 25G or a mix of 10G/1G speeds.

CNR-IMAA has also selected the new 720XP Series as new PoE+ access switches to deliver next generation Cognitive Campus solutions into their building to control end users access with 802.1x, whilst leveraging the same Arista EOS® and and CloudVision® software and extending the Universal Cloud Network architecture deployed in the new Data Center to their campus.



Conclusion

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As Ripepi explains, reducing management overhead for the four person IT team was key, "One of the advantages for us with the switch to Arista is its use of a single OS image for all devices along with CloudVision as a single point of management and orchestration for all devices. This combination simplifies our management tasks and improves the reliability of the entire network."

Arista engineers assisted across the project duration including connecting the new CNR-IMAA network onto the GARR Network, a nationwide network that interconnects at ultra-high capacity universities, research centres, libraries, museums, schools and other education, science, culture and innovation facilities across Italy.

The upgrade substantially increased the available bandwidth across the network, that now has 2x100Gbps for each link from leaf to spine. With the network no longer a bottleneck, CNR-IMAA has begun additional complementary projects to take advantage of its potential including an upgrade to its computational and storage infrastructure – and upgraded firewall design to meet the increased network performance.

"The Arista team has been with us across the entire project and helped us to deliver a successful upgrade," says Ripepi, "The new network will better support our researchers and scientists to continue their pioneering work and improve collaboration with colleagues across the world," he concludes.

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