

Naples University set to bring scientific R&D to market faster with high performance computing

EXECUTIVE SUMMARY
CUSTOMER NAME · University of Naples
LOCATION · Naples, Italy
INDUSTRY · Education
COMPANY SIZE · 105,000 students and staff
BUSINESS CHALLENGE <ul style="list-style-type: none"> · Maintain a reputation as a leading scientific research and development center · Increase the potential to attract new funding and investment in innovation · Utilize existing computing resources more effectively
NETWORK SOLUTION <ul style="list-style-type: none"> · Cisco High Performance Data Center · Cisco Metropolitan Area Network (MAN) · Cisco Storage Area Networking (SAN)
BUSINESS VALUE <ul style="list-style-type: none"> · Increases capability to bring new research and development to market faster, enhancing peoples' lives and the Italian economy · Ability to take on more research and development projects · Helps increase and enhance the University's reputation as key center of innovation, helping to attract more inward investment · Increases new research funding opportunities · Creates a world class high performance computing environment for faster, more efficient research



A Cisco high performance data center solution is expected to help one of Italy's leading research and development universities to improve and increase the use of computing resources, enhance innovation, increase investment and bring scientific breakthrough to market faster.

Business Challenge

The Federico II University of Naples is the third largest university in Italy and one of the oldest in Europe. It was founded in 1224 by King Frederick II the Swabian and was the first university in the world to be structured in faculties. Notable alumni include Saint Thomas Aquinas the 12th century priest, philosopher and theologian.

Even when it was founded, the University had a keen interest in science which continues today. It has set up

SCoPE (High Performance, Cooperative and distributed System for scientific Elaboration) which is a research project led by the University's Information Services Centre (CSI) president Giuseppe Marrucci and co-funded by the Italian Ministry for Education and the EU. SCoPE involves creating a GRID network connecting up several University locations to effectively pool computing resources so they can be used for research projects – such as gene, physics and geographical research – that demand huge computational processing power.

Winning funding and increasing research and development for universities is very competitive and SCoPE will provide the University of Naples with a huge advantage in developing and bringing to market research that benefits peoples' lives and the Italian economy. SCoPE is like a single, virtual computer. But to work effectively, it had to be able to share computing resources between different faculties and locations and deliver very fast data communication speeds. Despite being several kilometers apart, the infrastructure had to perform as if was in the same room.



Francesco Palmieri, telecommunication systems director at the Federico II University of Naples, says, "The educational and research supercomputing market is one of the most competitive in the world. The University decided to adopt a high performance connectivity solution for its new HPC (High Performance Computing) data centre based on the best available

state-of-the-art interconnection technologies, such as 10 Gigabit Ethernet and Infiniband. Cisco represented the best price/performance connectivity solution for merging all the computing and storage resource available in the SCoPE project into a single cooperating infrastructure empowered by the available Grid technologies. The University needs to be able to continue to attract researchers and drive research in a timely manner. Time to publication has to be short in the universities since this means being able to receive more funds."

Network Solution

Within the context of the SCoPE project, the Federico II University of Naples has deployed an High Performance distributed Data Center solution on an existing Metropolitan Area Network (MAN) connecting up all the research centers in Naples participating to the SCoPE Grid infrastructure over optical fiber. The University's multi-ring dark fiber infrastructure is approximately 50km long.

The SCoPE Data Center infrastructure is built on Cisco connectivity technology capable of delivering 700Gbps internally and 20Gbps performance toward the MAN. Cisco is also used to deliver low network latency 10Gbps connections between servers needed, for example, for MPI applications.

The data center architecture also includes Cisco and EMC² Storage Area Networking (SAN) technologies which enable the University to virtualize data storage resources across the infrastructure. Cisco MDS switches have been used to service the high performance SAN connections. The overall SCoPE networking infrastructure connects departments such as the University's medical, engineering and bioinformatics faculties and is fully redundant. It currently supports about 350 servers (about 2800 computing cores) and 160TB of networked storage, but this is about to expand to over 2000 servers and 250TB of data storage.

The University has been able to reduce its carbon footprint and reduce floor space by using appropriate server clustering technology. Dell M600 blade servers and the Dell M1000e chassis form factor enable higher computing power within a limited floor space while Dell M600 Quad Core servers maximize power use and reduce the need for cooling. The installation and implementation of the solution has been designed and coordinated by Dell Professional Services.

As well as the SCoPE project, the University has used Cisco network equipment since 1997 for the backbone infrastructure interconnecting about 40 campuses and building locations around Naples. This supports the education, communication and administration systems and applications that the University uses.

Palmieri says, "We feel that Cisco's vision and attitude toward research is compelling and that the implemented SCoPE networking solution is and will deliver real value to the University because it is enabling us to tackle business pressures – like securing funding and bringing research to market faster – by consolidating, virtualizing and automating our computing resources to make them more efficient and cost effective."

Business Results

Palmieri says, "This is a new step in collaboration between a big networking company like Cisco and one of the greatest universities in Italy. It means SCoPE will have a modern, next generation network as the foundation for education in the region where all our students and employees and other research and business communities can work, interoperate and increase their knowledge."

With the help of the Cisco solution and SCoPE, the University will be able to undertake a range of new and innovative research and development projects. These include bioinformatics and chemistry projects that will bring new evolutionary health science applications to the healthcare and medical research market.



PRODUCT LIST

Routing and Switching

- Cisco Catalyst 6500 Series Switches
- Cisco Catalyst 2960 Series Switches

Data Center

- Cisco SFS 7000 Series InfiniBand Server Switches
- Cisco SFS 3012 Multifabric Server Switch

Storage Networking

- Cisco MDS 9500 Series Multilayer Directors
- Cisco MDS 9100 Series Multilayer Fabric Switches

The University estimates that because of the improved ease, speed and flexibility of sharing information that the new networking and computing infrastructure supports, it will be able to increase its ability to take on more research and development projects.

In addition, the University has also seen an increase in interest from government and the commercial world in the capabilities of SCoPE and a potential increase in investment.

In addition to the University's use, the SCoPE infrastructure is also available to business and other organizations in the region such as small and medium-sized businesses that will benefit from

networking and data center facilities that they could never afford individually.

Other benefits that the new network infrastructure brings to the University include making management of the high performance computing infrastructure simple and easy. The University's relationship with Cisco also means it will be able to learn about and introduce new technologies and innovations as demand on the University's resources increases.

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Francesco Palmieri, Telecommunication Systems Director, Federico II University of Naples



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Printed in the UK

The Print Consultancy (01483 771211) / Jan 09