GÉANT

perfSONAR MDM – delivering end-to-end monitoring for RedIRIS

Multi-domain monitoring service ensures high performance collaboration for Spanish research and education network

RedIRIS is the Spanish National Research and Education Network (NREN), providing advanced communication services to over 400 universities and institutions, enabling Spanish researchers and students to collaborate quickly and easily, both within the country and internationally through its links to the GÉANT pan-European network.

RedIRIS connects individual institutions either directly to RedIRIS-NOVA, its new 12,500km dark fibre-based communications infrastructure or via regional academic networks.

Like all National Research and Education Networks (NRENs), RedIRIS is dedicated to providing the highest levels of performance and service to end users. However as research collaboration has grown it involves more and more different networks. Spanish researchers now rely on multiple connections, from their local area network (LAN) and regional research network to RedIRIS at a national level and then potential international links, when they are working with colleagues in other countries.

As this complicated, multi-domain infrastructure spans multiple networks using different technologies and protocols, it can make it difficult to track down potential issues and ensure consistent performance. Consequently, network engineers have worked together to create perfSONAR MDM to provide a multi-domain monitoring service for the GÉANT Service Area (GSA). It enables engineers to access standardised performance information from monitoring points across multiple domains through a single screen, improving collaboration and making network troubleshooting transparent.

The Challenge
Ensure Spanish researchers benefit from consistent high performance when collaborating across multiple networks, both nationally and internationally.

The Solution
By deploying perfSONAR Multi-Domain Monitoring (MDM) across the RedIRIS backbone and within partner networks, engineers can access standardised network measurement data from multiple network domains quickly and easily.

Key Benefits
Engineers within RedIRIS and its partners can monitor end-to-end performance and troubleshoot problems before they impact users through fast access to standardised data, supporting projects as varied as the Large Hadron Collider and international dance performances.

perfSONAR MDM   Red IRIS

Measuring performance across Spain

RedIRIS has been heavily involved in the perfSONAR MDM project from its inception and was one of the first European NRENs to deploy perfSONAR monitoring points across its backbone network. It now has five monitoring points within RedIRIS-NOVA and uses the tool as its main monitoring platform. Additionally, as the GÉANT pan-European network and several Spanish regional academic networks and institutions have also deployed perfSONAR MDM, RedIRIS engineers can easily track information across multiple domains to deliver a real end-to-end view of performance.

Monitoring LHC data

The Large Hadron Collider at CERN is the largest scientific experiment in the world, producing over 20 petabytes of data every year. Analysing this data is a truly global collaboration, with a vast optical private network (LHC OPN), created by GÉANT and its NREN partners, distributing information around the world. LHC experimental data is first sent to 11 tier one sites, which then share it with over 140 further tier two locations. Ensuring consistent high performance of the network is critical to analysis of LHC data, and the tier one centre in Spain, PIC, and two of the Spanish tier two centres, CIEMAT and IFAE, have deployed perfSONAR MDM to monitor the end-to-end links that connect them to the LHC OPN.

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> In an era of increased collaboration it is vital that we provide end-to-end performance monitoring across multiple networks to our users. perfSONAR MDM is the perfect solution for RedIRIS and its partners – not only does it have unique multi-domain functionality but it is simple to share and use. This means we can quickly correlate and understand performance across multiple different networks, ensuring projects in areas as varied as science and the arts benefit from the highest levels of service, underpinning greater collaboration for our users. From the LHC to dance collaboration, perfSONAR MDM is at the heart of our monitoring infrastructure.
>
> *Alberto Escolano Sanchez, Network Engineer*
> *(expert in Monitoring Services), RedIRIS*

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> The experiments carried out at the Large Hadron Collider are fundamental to better understanding the world around us and how it operates. Given the sheer scale of the results created global collaboration between researchers is central to analysing and understanding experimental data. Using perfSONAR MDM enables us to monitor end-to-end performance to ensure that our scientists can receive the vast amounts of data created by the LHC and in turn, share their analysis with colleagues across the globe. Combining ease of use with powerful capabilities perfSONAR MDM is vital to support our research work as part of the LHC community.
>
> *Gonzalo Merino, LHC Tier1 Project Manager,*
> *Port d'Informació Científica (PIC)*

Linking the arts in real-time

perfSONAR MDM isn't just used to support scientific research, having been central to a recent real-time dance performance that brought together dancers in Brasilia and Barcelona. Held as part of the 2011 TERENA Network Performing Arts Production Workshop, the event saw the dancers performing together in choreographed unison, using video cameras, image projection and high capacity networks to interact on a virtual stage, as if they were all in the same place.

Ensuring the performance was in step required fast, high capacity and stable network links between the two venues and the five research networks involved, including RedIRIS and GÉANT, used perfSONAR MDM to test the route, monitor for potential problems and solve any issues before the performance began.

Whether in the arts or sciences, the power and ease of use of perfSONAR MDM is enabling RedIRIS to monitor multi-domain performance and ensure the highest levels of service for its users.

connect • communicate • collaborate

The world is criss-crossed with high-capacity data communications networks, connecting and serving research and academic institutions across the globe. The most advanced of these is GÉANT, serving Europe. GÉANT interconnects with counterparts across the world, such as Internet2 in the USA as well as national networks such as RedIRIS in Spain.

Separate from the public Internet for reasons of security and performance, these networks make an enormous practical contribution to research in a wide variety of areas – saving lives,

building knowledge, establishing real-time co-operation between scientists all over the world as well as underpinning artistic collaboration.

perfSONAR MDM is GÉANT's service based on the perfSONAR concept. Its large scale monitoring infrastructure delivers standardised measurement data, easily accessible through a web-based interface to make network visualisation and troubleshooting straightforward and effective.