Contribution ID: **4** Type: **not specified**

Scitags: A Standardised Framework for Traffic Identification and Network Visibility

Wednesday, 15 October 2025 15:45 (30 minutes)

High-Energy Physics (HEP) experiments rely on complex and large scale networks spanning vast geographical areas and interconnecting heterogeneous sites, data centres and instruments. Managing these networks in the face of high-intensity data flows such as those intrinsic to HEP workflows poses a significant operational and administrative challenge. These conditions are expected to worsen in the HL-LHC era with its accompanying increase in data rates. The currently limited visibility into network traffic flows hinders network operators' ability to understand user behaviour across different network segments, optimise them for performance and effectively debug and troubleshoot issues.

The Scitags initiative strives to address these challenges by improving network visibility through standardised datagram marking and flow labelling techniques. Formed within the Research Networking Technical Working Group (RNTWG) in 2020, Scitags aims to develop a generic framework and standards for identifying the owner and associated scientific activity of network traffic. This framework's potential use extends that of the HEP/WLCG experiments and steeps into any global community making use of Research and Education (R&E) networks.

This presentation will detail the current state of the Scitags initiative, including the evolving framework and its implementations alongside the tried and tested technologies they are built on including eBPF and IPv6 Extension Headers. The roadmap towards production deployments in both R&E networks and Storage Element implementations such as XRootD will also be discussed. By providing a larger network visibility, Scitags will empower network operators to optimise performance, troubleshoot issues more effectively and allow for a more performant use of networks in support of the needs of data-intensive scientific collaborations.

Authors: HANUSHEVSKY, Andrew Bohdan (SLAC National Accelerator Laboratory (US)); LAKE, Andy; HOEFT, Bruno Heinrich; CARDER, Dale (ESnet); ATTEBURY, Garhan (University of Nebraska-Lincoln); LETTS, James (Univ. of California San Diego (US)); MAMBRETTI, Joe (International Center for Advanced Internet Research Northwestern University); NEWELL, Karl; BABIK, Marian (CERN); LAMBERT, Michael (Pittsburgh Supercomputing Center); COLLADO SOTO, Pablo (Universidad Autonoma de Madrid (ES)); MCKEE, Shawn; CHOWN, Tim; SULLIVAN, Tristan (University of Victoria)

Presenter: COLLADO SOTO, Pablo (Universidad Autonoma de Madrid (ES))

Session Classification: XRootD Presentations