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Multi Messenger data analysis challenges in the EOSC framework

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Extreme astrophysical events can send us physical information through complementary messengers of different nature:
gravitational waves (GW), electromagnetic radiation, neutrinos or other particles.

On August 17th 2017, the first multi-messenger astrophysical source (GW170817) was revealed,
thanks to the coordinated action of gravitational wave detectors, gamma ray burst monitors and optical and radio telescopes,
which gave us a complete picture of the coalescence of two neutron stars.

With 3rd Generation gravitational wave detectors and the new astronomical facilities (LSST, ELT, SKA, CTA, KM3NET),
we expect many events like that. We anticipate the need to analyse the data provided to us by such events, to fulfill
the requirements of real-time analysis, but also in order to decipher the event in its entirety.

The use of machine and deep learning techniques has become increasingly common in scientific communities.
The large amount of data to analyze and the need for real-time analysis are driving the search for cutting-edge techniques
and new data analysis paradigms. Especially the field of deep learning for event-based, image-based and signal-based applications
of two and higher dimensions has been intensively followed by expert groups within the ESFRIs and will be deployed to the EOSC via ESCAPE.

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Session Classification:　Multi-messenger science potential with future detectors and requirements for the future network for an optimal science exploitation