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The Information Standards Advisory Panel (ISAP) of the Australian National Earth and Environmental Sciences Facilities Forum (NEESFF): Coordinating National Data Infrastructures to Support Global Data-Intensive Research.

Monday 13 October 2025 18:00 (1h 30m)

The National Collaborative Research Infrastructure Strategy (NCRIS, https://www.education.gov.au/ncris) is a uniquely Australian initiative that enhances the impact of national research infrastructure investments by fostering collaboration, coordinating open access, supporting specialised capabilities, and enabling co-funding across the country.

In 2018, Earth and Environmental (E&E) NCRIS facilities and related government organisations self-organised to create the National Earth and Environmental Sciences Facilities Forum (NEESFF) to better plan and coordinate infrastructure investments and associated data assets. Current NEESFF Members include Atlas of Living Australia (ALA); Australia's Climate Simulator (ACCESS-NRI); AuScope (Geoscience); Australian Urban Research Infrastructure Network (AURIN); Australian Research Data Commons (ARDC); Australian Plant Phenomics Network (APPN); BioPlatforms Australia; Geoscience Australia (GA); Integrated Marine Observing System (IMOS); Terrestrial Ecosystem Research Network (TERN); Marine National Facility; Bureau of Meteorology (BOM); National Computational Infrastructure (NCI); Pawsey; and the Australian Academic and Research Network (AARNet).

Data collections generated and/or used by NEESFF facilities are heterogeneous and range from petascale satellite and geophysics data collections, climate/weather reanalysis models, to automated fixed sensor observation datasets including camera traps, acoustic recordings, stream flows down to traditional small volume human and field measured observation datasets measured in megabytes that can be critical in calibrating the large volume remotely sensed data collections. These significant data collections are made accessible for data-intensive processing, analysis and/or modelling on various computational infrastructure ranging from co-located High Performance Compute and Data (HPCD) platforms to public and private cloud to on-premise facilities.

Increasingly complex data coordination issues across NEESFF facilities, particularly for critical longitudinal E&E monitoring systems, led to the formation of the Information Standards Advisory Panel (ISAP) in 2020 as a subcommittee, comprising informatics specialists from member organisations.

To build community, enable prioritisation and provide clarity, NEESFF facilities held the Integrated Earth 2023 Conference (https://www.tern.org.au/integrated-earth/), bringing together researchers from all parts of the Earth System, including geosphere, biosphere, cryosphere, hydrosphere, atmosphere and anthroposphere, with support from the Australian Academy of Sciences. Integrated Earth provided a cross-disciplinary community for Australian E&E researchers, and their research data, ensuring that, whilst perhaps collected in isolation and for a specific research problem, data can be integrated across a wide range of possible applications, ranging from HPC-D to local observations. The conference also showed that if datasets were fully FAIR compliant, machine-actionable and utilised international data standards, they could also be part of international data networks, including those supporting the UN Sustainable Development Goals.

With Integrated Earth 2023 providing the vision and ambition, ISAP members are now collectively working to create a national data ecosystem that enables real-time machine-actionable processing and data integration across all Earth System Spheres, at all processing scales and data volumes.. Rather than coordinating data across NEESFF in isolation, many members are also participating in global RIs, e.g., TERN is a participant in the Global Ecosystem Research Infrastructures (GERI), ALA the Global Biodiversity Information Facility (GBIF), ACCESS-NRI and NCI the Earth Systems Grid Federation (ESGF), Auscope has formed a network with

the European Plate Observing System (EPOS), the US EarthScope and GNS Science Te Pū Ao New Zealand. Additionally, some members actively participate in the CODATA-led Worldfair+ initiative to improve data interoperability and support Open Science principles.

This poster will outline initiatives ISAP is undertaking to develop a framework for delivering integrated E&E datasets that operate on and across local, regional, national, and international scales. This framework would enable processing across multiple scales of computational infrastructure and data volumes across all Earth System spheres.

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