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Strengthening Trusted Research Environment Interoperability: A Metadata Platform Enabling Population-Scale Data Linkage Research

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Trusted Research Environments (TREs) increasingly underpin cross-sectoral and population-scale data linkage research, yet no single product currently provides a flexible, interoperable way to store and expose the breadth of a TRE's data assets, let alone in a useful way. Existing systems often lack the adaptability needed to incorporate diverse TRE outputs or support an organisation's workflow requirements. We sought to develop a system that enhances interoperability, integration, and usability of diverse data sources to drive core TRE functions. SeRP created the Data Portal platform to address this gap, using an in-house development approach to ensure tight integration with its own TRE operations. The platform enables the capture, management, and dissemination of metadata through three core components: a configurable form builder to capture data first-hand within the sys-

tem and import tool for data capture from external sources; a high-performance database to store and serve metadata at scale; and a template engine for a flexible user interface presentation. This architecture supports a wide array of TRE-relevant asset types—including dataset definitions, data linkage releases, data quality assessments, provisioning specifications, project and governance metadata, and project outputs and is designed to interoperate with SeRP's own TRE management tools and third party infrastructures. Harnessing this data from one central repository allows it to be used to drive essential TRE services such as project applications, dataset and variable selections for provisioning, governance management, project impact tracking, data cataloguing etc. which will ultimately improve research with linked population data.

