

Property Graph Transformations in Action: From Data Integration to Causal Analysis

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Abstract

This keynote presents scalable declarative approaches to property graph transformations for data integration and data cleaning, and shows how they extend to causal inference and path-based causal analysis.

Keywords

property graphs, causal analysis, data integration,

1. Talk Summary

Property graphs are key components of modern graph databases and graph analytics systems. They support highly expressive data models consisting of multi-labeled nodes and edges, together with properties represented as key-value pairs. Property graphs are versatile data integration paradigms, enabling data in virtually any format to be seamlessly transformed to this model. Moreover, they are at the core of an active standardization effort led by ISO/IEC to establish standardized declarative graph query languages such as GQL and SQL/PGQ. In addition to these data manipulation language standards, complementary languages for property graph schemas and constraints are emerging as part of future data definition languages.

The talk will introduce novel declarative paradigms for property graph transformations that support both graph-based data integration and data cleaning tasks. Beyond being declarative, these transformations are designed to achieve efficiency and scalability. Furthermore, they are flexible enough to be applied in other contexts, such as causal inference and causal analysis, where declarative graph languages enable complex, path-based causal operations.

2. Biography

Angela Bonifati is a Distinguished Professor of Computer Science at Lyon 1 University and at the CNRS LIRIS research laboratory, where she leads the Database Group. She is also an Adjunct Professor at the University of Waterloo, Canada since 2020, and a Senior Member of the French University Institute (IUF) since 2023. Her current research interests span several aspects of data management, including graph databases, knowledge graphs, and data integration, as well as their applications to data science and artificial intelligence. She has co-authored numerous publications in top venues in the data management field, including five Best Paper Awards, two books, and an invited paper in ACM SIGMOD Record (2018). She is the recipient of an ERC Advanced Grant (2024) and an ACM Fellow. Her work has been recognized with the VLDB Women in DB Research Award (2025), the IEEE TCDE Impact Award (2023), and an ACM SIGMOD Research Highlights Award (2023). She is the General Chair of VLDB 2026 and has previously served as Program Chair of IEEE ICDE 2025, ACM SIGMOD 2022, and EDBT 2020. She is currently an Associate Editor for the Proceedings of the VLDB (Volume 19), IEEE TKDE, and ACM TODS. She is also the current President of ACM SIGMOD (2025–2029), a member of the IEEE

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