



CSSI Element: Virtual Information-Fabric Infrastructure (VIFI) for Data-Driven Decisions from Distributed Data [NSF DIBBs Award #1640818]

Award #: 1640818

NSF CSSI PI Meeting, Seattle, WA, Feb. 13-14, 2020

Key Points

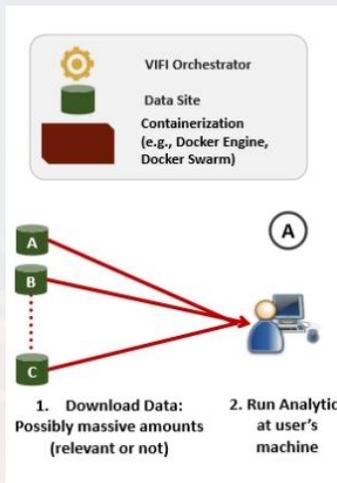
- VIFI presents a **transformative infrastructure** that empowers data users to discover, analyze, transform, and evaluate distributed, fragmented data without direct access to or movement of large amounts of data, enabling analyses that are otherwise impossible, infeasible, or impractical.
- VIFI provides data users support for the **full lifecycle of inquiry, analysis, and data-driven discovery**.
- VIFI also enables data owners to **share data indirectly** and facilitates automated methods for data-driven insights to **broader communities**.
- The VIFI **architecture enables novel support** by linking: remote storage; distributed orchestration and hybrid infrastructure management; distributed data management; publishing; and, transparent access to resources.
- VIFI **removes barriers** between utilizing, developing, and remixing interfaces to data through a **generalized, discipline-agnostic approach**, and enables communities to investigate questions that otherwise are impossible, infeasible, or impractical to explore.
- VIFI demonstrates its capabilities within **multiple science and engineering domains**, including Earth Science, Astronomy, and Sustainable Human-Building Ecosystems. }

PIs & Partnering Institutions

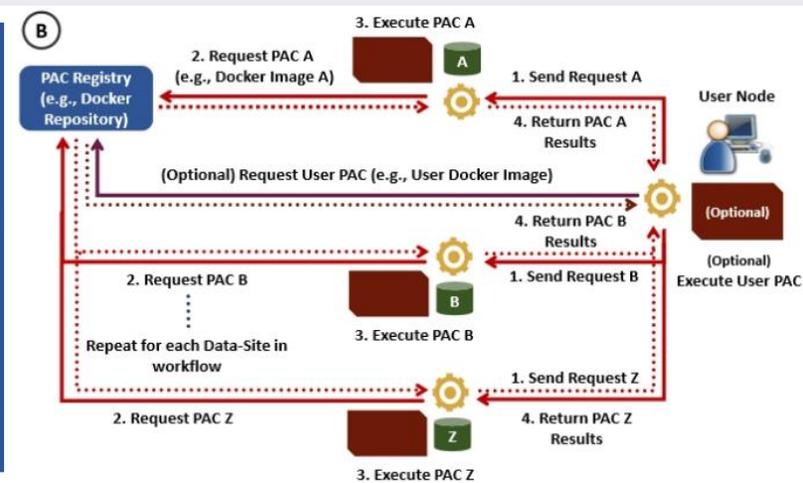
UNC Charlotte (William J. Tolone – Lead PI, Hadzikadic, Wang, Zadrozny, Dou, El-Shambakey, Das Bhattacharjee); **North Carolina A&T** (Cho); **Caltech** (Djorgovski, Mahabal); **Jet Propulsion Lab** (Crichton, Lee, Braverman, Johnson); **LSU** (Zhu); **Cleveland State University** (Tao); **CMU** (Karaguzel); **FSU** (Feiock); **Lawrence Berkeley National Lab** (Hong); **University of North Texas** (Huang, Cai)

VIFI Architecture

(A) Traditional Information Fabric

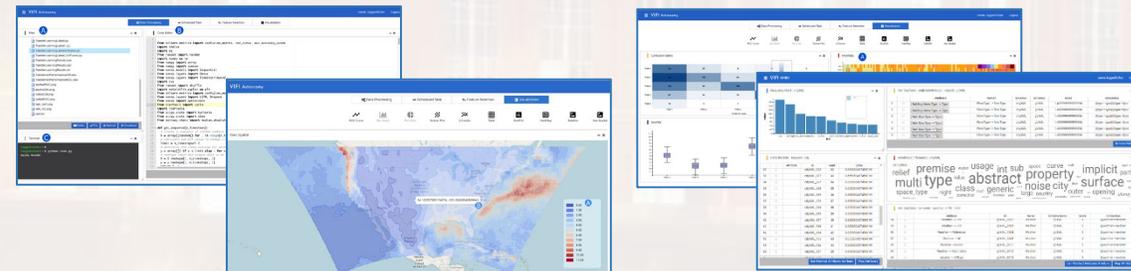


(B) VIFI Information Fabric



ACKNOWLEDGEMENT

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Impact

- Orchestrated execution of distributed analytical workflows
- Distributed analysis across multiple data sites
- Data migration limited to derived analytical results
- Advancing research in multiple (use case) domains *
- Opening new research directions – e.g., novel, VIFI-inspired analytical methods (e.g., cost v. uncertainty; multi-view, generative transfer learning; visualization recommendation)

