



Key Points

- Big Data enables users to spot emerging trends, identify hidden linkages among diverse data, rapidly detect correlations with incoming feeds, and highlight abnormal conditions.
- Big Data sizes are a moving target and range from a few dozen terabytes to several petabytes of data.
- NCI has been developing enterprise information management and advanced analytical solutions for customers across the Federal Government.

Customer Challenges

The depth and breadth of data that can be captured for further analysis are increasing at an exponential rate. Data can come in multiple forms: structured entries in a relational or object database, unstructured documents, semi-structured electronic forms, geospatial positions, websites, embedded sensors, etc. However, traditional database management tools cannot automatically analyze captured data without additional effort, pre-processing, and/or advanced analytical techniques to mine relevant information, understand discovered patterns, and drive subsequent action. A current—albeit loosely defined—term for this is “Big Data.”

Customer Benefits

Our work within the Intelligence and Healthcare Communities in information sharing and knowledge management, advanced graph analytics and enrichment services, data mining, high-performance computing (HPC), and grid computing resolves the most complex high-volume analysis problems our nation faces. For Big Data, traditional relational databases and statistics/visualization packages are oftentimes insufficient for this class of problem. What is needed instead is massively parallel software running on numerous servers. We are leveraging these game-changing technologies to deliver relevant information in near real time, enabling rapid response to dynamic counter-terrorism missions and fraud-, waste-, and abuse-detection needs.

NCI Solutions

The first step in enriching data and turning volumes of data into actionable information is to manage data as part of a holistic enterprise information strategy focused on information workers’ needs. This is known as enterprise information management (EIM). NCI has partnered with large platform providers like Oracle, SAS, Microsoft, and EMC for EIM and Big Data solutions, and we are adept at the following:

- Implementing/managing HPC and highly scalable (vertically and horizontally) systems.
- Leveraging/integrating open source, commercial off-the-shelf (COTS), and specialized Government off-the-shelf (GOTS) software solutions.

Enterprise Information Management and Advanced Analytics

Focusing on delivering innovative technologies to solve our customers' complex challenges, NCI has emerged as a leader in mission-oriented intelligence-to-operations initiatives that reduce the time to turn data into actionable information. We have significantly enriched the intelligence-to-operations lifecycle for key Intelligence and Healthcare Community customers by applying scalable technologies and advanced algorithms to help make sense of data. NCI's technical experts in ontology research, visualization, data modeling, and computational linguistics provide enterprise capabilities to satisfy mission and customer needs. We couple these technical experts with regulation and healthcare subject-matter expertise to spot anomalies indicative of fraudulent, wasteful, or abusive behaviors. As a result, NCI directly supports rapid and relevant discovery, anticipatory intelligence, focused analysis, and persistent surveillance across multiple customer domains and operational disciplines.

Enterprise Information Management

We leverage enterprise information architecture principles to establish data standards/guidelines that enable clients to manage enterprise information through improved metadata management, master data management, data integration, and data quality projects.

Advanced Analytics

Our solutions generally combine the functional expertise and knowledge of domain experts (who know what to look for) with advanced data mining and statistical algorithms (leveraging Big Data solutions to find anomalies quickly). Common techniques include cluster analysis, data fusion and integration, machine learning, natural language processing, neural networks, predictive modeling, time series analysis, and complex visualization (graph analytics).

NCI Facts

Advanced analytics is most powerful when combining advanced technical capabilities on top of HPC platforms with mission-focused disciplines like regulation and healthcare subject-matter expertise. Our staff has clearances/expertise to accomplish the following:

- Handle sensitive or classified data for our nation's Intelligence and Healthcare Communities.
- Manage chain-of-custody requirements, including collecting, transferring, analyzing, and disposing of evidence-related data and information.

**NCI—Trusted partner when
and where you need us most.**

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