



BY JELANI HARPER

Business intelligence tomorrow... and what it means for today

Business intelligence (BI) is quite possibly the single point of constancy in the ever-evolving data ecosystem. Regardless of which technologies emerge or architectural shifts occur, the foundation of data's overall utility for most organizations will almost always be the ability to serve business users.

Developments in this domain tend to resonate throughout the data landscape as a whole—much more so than other aspects of data management do. The movement toward self-service was born with BI. BI typifies the advantages of cognitive computing via natural language queries, search-based analytics, and statistical AI recommendations.

Still, BI's crowning accomplishment is more than just exemplifying the democratization of AI, the ubiquity of hybrid and multi-cloud developments, or even the accessibility and reliability that provides governed self-service across business units.

BI's greatest achievement is in extending the self-service movement beyond individual visualizations, dashboards, and reports to comprehensive solutions in which "BI vendors look at the opportunities and challenges presented by serving many different customers with their singular platform," acknowledged Charles Schaefer, Tableau (www.tableau.com) senior manager of competitive intelligence.

By merging each component of the self-service experience into a comprehensive platform, contemporary BI centralizes:

- ◆ **Metadata management:** By providing a holistic means of managing all metadata relevant to business users and their tools for working with data at scale, modern self-service BI platforms streamline one of the critical prerequisites for consistently being able to reuse data for timely analytics.
- ◆ **Semantics:** Self-service repositories are relatively worthless without a well-defined, clear understanding of the data's meaning, which is best facilitated in terms business

users comprehend. According to Vijay Anand, MicroStrategy (www.microstrategy.com) VP of product marketing, effective BI platforms are underpinned by a semantic layer that is not just a siloed way of consuming information but consolidates all of the sources into a singular semantic graph.

- ◆ **Data cataloging:** Enterprise data catalog tools are required for any uniform means of managing data. They're influential for classifying information and strengthening the governance protocols necessary to prevent self-service from burgeoning into data chaos. Enterprise data catalogs are "really designed to provide a governed layer on top of, for example, a data lake, so you can on-board data, you can manage it, and make it available for consumption in basically a marketplace paradigm," Mike Potter, CTO of Qlik (www.qlik.com), revealed.
- ◆ **Data models:** All-encompassing, self-service BI platforms also account for the plethora of data modeling concerns in standardized ways, aligning data of different formats, structures, and schema. "Data sources themselves need to be described and so does the kind of metadata you're going to use: a name, a region, or some other kind of property," explained Irene Polikoff, CEO of TopQuadrant (www.topquadrant.com). "That's the definition of the schema that you would be using to enrich and describe those datasets for self-service."

By unifying all of these aspects of data management for expedient, trustworthy access to data in a single platform, BI empowers much more than analytics. Tomorrow, it'll serve as the launching point for the most advantageous means of managing data for all users (and use cases), including edge computing, application building, data strategy, hybrid and multi-cloud deployments, and alternative, unstructured data sources.

Natural language search

One of the defining characterizations of post self-service BI is the incorporation of the various dimensions of natural language processing (NLP). "NLP will be really impactful to BI because it allows anyone to perform queries on their data in the same way they might search for information in a search engine," Schaefer noted. "The technology interprets their question and translates it into an analytical query."

The immediate effect of leveraging BI in natural language is that it puts the power of analytics in the hands of a broader user base that's not necessarily data-savvy. Although NLP is the overarching term for interacting with IT systems in natural language and accounts for basic semantic understanding, additional NLP capabilities of BI platforms involve:

- ◆ **Natural language generation (NLG):** The converse of NLP, NLG evokes responses to queries in natural language. Some platforms utilize NLG so that "any chart or graph within a dashboard can be translated into text-based narratives" Anand said. NLG gives visualizations a

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- ◆ **Natural language interaction (NLI):** NLI is considered a combination of NLP and NLG. It typifies the conversational interfaces that natural language delivers to BI and is implemented via chatbots in some instances in which, "You ask a question in natural language and it gives you an interactive response where it provides analytic responses and visualizations," Potter said. "It allows you to iterate, to interact, and to disambiguate your question."
- ◆ **Natural language understanding (NLU):** NLU is a sub-category of NLP focused more on intention and understanding of the words used in natural language, as opposed to their semantic meaning.

Augmented analytics

The entire suite of natural language is influential in what's termed "augmented analytics"—the use of various dimensions of AI to effectively "augment the analyst by automating and simplifying certain tasks and allowing people to focus on the richer analytics experience, their ability to ask questions, and to continue exploring their data," Schaefer denoted. Various forms of machine learning abet

augmented analytics in a number of ways. According to Anand, a recurring use case for this technology with holistic BI platforms is to "create usage-based recommendations and personalized insights" predicated on previous data discovery or analytics results. The collection and analysis of telemetry and usage behavior "complement the semantic module," Anand said, and also inform machine learning results in this use case. Additionally, machine learning is influential in helping business users connect to data sources and "know which databases to access, which tables need to be combined to answer their question, and how to join those tables together," Schaefer posited.

Maximizing the cloud

Many comprehensive BI platforms function equally well, whether on-premise or in the cloud. Nonetheless, they heighten hybrid and multi-cloud deployments in several critical ways involving:

- ◆ **Scalability:** It's difficult (and much less cost-effective) to match the cloud's ability to scale with conventional on-premise options. The abundance of cloud data stores are perfect for data warehousing "because so much of the systems that support businesses today are becoming SaaS supported, [so] data is starting in the cloud and living its entire life there," Potter commented.
- ◆ **Transformation:** Transformation is still a vital aspect of integrating data for applications such as BI. ETL measures will likely continue to persist, particularly when "automating ETL via automated scripts," Potter said. When it's done in the cloud, however, ELT—which minimizes the steps for loading data while leveraging the processing resources of the underlying data repository—makes that data "almost instantly available," said Frank Bien, CEO of Looker (<https://looker.com>).
- ◆ **Reduced cycle times:** Most cloud BI platforms have a host of connectors for the popular cloud resources impacting business users. Organizations can readily use them to connect to data sources, make data expediently available via ELT and schema on-demand options, and then swiftly get analytics to business users. "Older BI tools required 6-12 month planning processes before people could even start using them," Schaefer

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said. “Cloud technologies take that lengthy cycle out of the equation.”

BI on unstructured data

Another exciting aspect of the transition from self-service BI tools to self-service BI platforms with uniform semantic, metadata, and classification capabilities is the incorporation of unstructured data for business use. Typical BI tools worked almost exclusively on structured data,

Progressive vendors in this space are able to embed this “analytics engine into any device for IoT use cases,” Potter said. The revolutionary nature of this aspect of Internet of Things analytics—which are widely predicated on filtering the results of analytics at the edge before sending them to a centralized location—is readily apparent. “Rather than collecting vast amounts of low-value data, we’re using our analytics engine to capture meaningful analytic events and push those back instead, so that you’re actually

to solve underlying business problems with data (the essence of data strategy) are all possible with such contemporary BI solutions.

The new mission

Due to its expansion from a random assortment of tools to centralized platforms delivering rapid data access to a breadth of sources in a governed, self-service manner, the very mission of BI is changing. These capabilities are enabling BI to widen its focus from business applications to enterprise applications, regardless of the use case. BI is “really about creating something that you can build on top of and go further to start to break the chains and solve the problems of [data] access and reliability,” Bien asserted. “As you solve those base needs, sort of like the base needs of hunger and shelter, then you can start to move up the value chain more and provide even more to people in your organizations.”

Moreover, the merit of these self-service platforms is unequivocally horizontal. Polikoff described a life sciences use case in which there are many vocabularies that companies are using—such as ICD9—and others. “They’re taking this information, their clinical trials or whatever, and they’re linking it to those common standard

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and even today, the most sophisticated BI platforms offer only limited utility for semi-structured data. Nonetheless, the wide assortment of social, mobile, and alternative unstructured data sources that considerably enhance the analytics experience require “an environment where the meaning is accessible,” stated Robert Coyne, CMO of TopQuadrant. “This means you have to have models of the entities and the semantic types, properties, and interrelationships.” Self-service platforms accessible for BI (and almost any other use case) fortified by standardized approaches to data models, taxonomies, and relationships extend these benefits to alternative unstructured data, as well as to structured and semi-structured data. The singular alignment of all these types of data is necessary to deliver “the right information to the user looking to use self-service, to get exactly the data they need,” Polikoff said.

Embedded analytics at the edge

Other compelling developments in BI heralding its future relate to the expansion of access. According to Anand, increasing usage of mobile technologies is influencing comprehensive BI platforms predicated on “touch-optimized experiences that are very mobile-specific and also allow offline and transaction-based actions as well.” Somewhat parallel to the trend of mobile technologies with BI is its inclusion as part of edge computing, which eminently reflects the tendency toward embedding analytics. Truly comprehensive BI platforms are characterized by analytics engines that can perform the computations users need for analytics.

doing central analysis on much higher value information,” Potter commented.

Data strategy

The advancements BI is producing today and tomorrow are perhaps most profound in terms of their effect on data strategy. Now that BI solutions encompass holistic platforms for sustainable, governed, self-service access to data at fundamental levels (metadata, semantics, classifications, and data models), this discipline is transitioning from merely

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servicing business users to servicing the enterprise as a whole. Such platforms can facilitate the same benefits of reliability, expedience, and self-service to a range of other use cases. As such, it’s a pivotal implement for “enabling a customer’s data strategy to be integrated with their analytic strategy,” Potter remarked. This concept is relatively simple, yet unambiguously brilliant. Organizations can use the centralized mechanisms supporting these holistic BI platforms in any way they see fit. Developers, for instance, can leverage them to create the most meaningful applications, as well as to analyze their effects on business processes. Edge deployments, the incorporation of unstructured data alongside structured data, and the foundational capabilities

terms. This is how they know they can integrate it; this is how they know the meaning.”

In this respect, the mission of BI is only constrained by the goal of the organization deploying it, since holistic BI solutions fortify users to employ the tool they love on the platform they trust, Anand said. If users want to leverage other tools and interfaces, there are APIs for doing that, but they can still use the semantic layer to govern data for centralized or decentralized use, he added. ■

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