Open versus Embedded Analytics

Decision Criteria for Cloud ISVs

By Wayne Eckerson / Stephen J. Smith March 2017

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About the Author

Wayne Eckerson has been a thought leader in the business intelligence and analytics field since the early 1990s. He is a sought-after consultant, noted speaker, and expert educator who thinks critically, writes clearly, and presents persuasively about complex topics. Eckerson has conducted many groundbreaking research studies, chaired numerous conferences, and written two widely read books on performance dashboards and analytics.

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About Eckerson Group

Eckerson Group is a research and consulting firm that helps business and analytics leaders use data and technology to drive better insights and actions. Through its reports and advisory services, the firm helps companies maximize their investment in data and analytics. Its researchers and consultants each have more than 20 years of experience in the field and are uniquely qualified to help business and technical leaders succeed with business intelligence, analytics, data management, data governance, performance management, and data science.

Analytics Options for Cloud ISVs

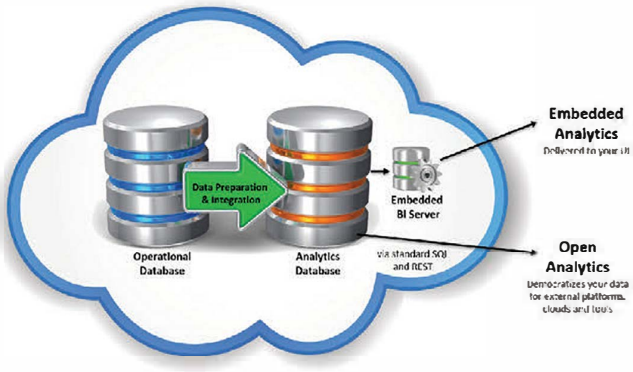
Cloud application vendors are under pressure to provide multi-faceted support for analytics. Today's customers expect more than just static reports or dashboards; they want an interactive, visual experience along with the ability to create and publish their own reports and dashboards and perform sophisticated analytics on data.

To meet customer demand, cloud independent software vendors (ISVs) have three options:

1. **Embedded Analytics.** ISVs can embed a third-party analytics product and make it look and feel like their own through custom integration and white labeling.
2. **Open Analytics.** They can expose an open application programming interface (API) that enables customers to use an analytics tool of their choice to connect to the ISV's cloud application.
3. **Hybrid.** They can support both strategies.

From a customer's perspective, there are advantages and disadvantages to each approach. (See Figure 1.)

Figure 1. Cloud Architecture



Embedded Analytics

The embedded strategy gives customers a holistic experience in which analytics is tightly coupled with a host application. The analytics functionality not only looks like the application, but also integrates with its security model and interacts with it in a bidirectional manner. For example, customers viewing an inventory trends chart can click on it or an alert about low inventory levels to issue a purchase order to restock items.

On the other hand, customers need to spend time learning the analytics functionality embedded in the application. If a customer has multiple cloud applications, each of which has its own embedded analytics capabilities, customers will need to learn each analytics tool anew. This takes time and creates a suboptimal customer experience.

From the ISV perspective, an embedded analytics tool might help them gain a competitive edge, catch a fleet-footed rival, increase customer satisfaction, or generate additional revenue or market share. However, embedding an analytics tool is not easy or inexpensive. Currently, there is no analytics tool that has all the features and functions a cloud ISV might want. Consequently, there is always a need for custom development work, which takes time and money. And it can be challenging to upgrade the customization once the analytics vendor ships a new release.

Open Analytics

Although most customers want cloud applications to embed analytics, they also want to query cloud applications with their company-issued business intelligence (BI) tool, such as Tableau, Power BI, Qlik, or MicroStrategy, and languages or tools for creating analytic models, such as R, Python, Matlab, SAS, or SPSS. With an open analytics approach, customers can query individual cloud applications to get operational data. Or they can query multiple cloud and on-premises applications and stitch together the results into a single report or database that others can query.

Thus, with open analytics, business users can use the analytics tool or language of their choice to query any cloud application they want. This is now a critical requirement as customers demand the ability to query and consolidate operational activity across multiple applications. This also protects customers who want to migrate an on-premises application to the cloud, since connectivity is maintained despite the platform change.

The value of open analytics is not limited to just BI and reporting. Machine learning tools and algorithms are now being deployed throughout the enterprise for applications like fraud and security breach detection and product recommendation. The algorithms that make up machine learning, such as deep learning or decision trees, benefit tremendously from the richness and diversity of data. Providing flexible access to the data from ISV applications can turbocharge the performance of machine learning for the customer.

On the downside, customers don't receive an integrated analytics experience with an open analytics approach. The host application and analytics tool are distinct products with unique graphical user interfaces (GUIs), features, and functions, and little integration between them. Moreover, some cloud applications may not have a robust enough API to support the types of queries that users want to ask. Also, users have to log on separately to each application.

From the ISV perspective, open analytics requires a commitment to openness. The ISV must decide to give a bevy of third-party applications access to its environment. It must be ready to create, publish, and maintain an open, standard API, such as OData, that makes it easy for third-party tools and languages to access the cloud application data. They can then also rely on these open standards for libraries and support.

Some ISVs create a simple representational state transfer (REST) API that they believe will be sufficient, but REST APIs are not necessarily designed to support third-party tools like BI, which must interoperate. There are many apps with different REST APIs, each with different syntax and semantics. Some expose metadata; some have a query language; and each is proprietary. OData standardizes this.

It would also be wise for ISVs to establish a program to support developers and users who want to use or query their API. Not all APIs are created equal. Building a robust API takes time and money.

Building versus Buying a Data Connectivity Solution

The Woes of Building

Building an API for analytic queries is not for the fainthearted. To provide programmatic access to data, ISVs need to build a RESTful API. Because REST doesn't really describe how data is transferred, implementers are mostly left on their own to figure out how to do it. Once an API is designed, it needs to be documented and published. Then, the ISV needs to provide a forum or support service to help customers access and use it.

To support SQL queries, an ISV needs to create a data connector to its application and publish it. It then needs to work with BI and tool providers who want to use the connector to query their application's database. Like the API, the data connector can be simple or robust: it can provide lowest common denominator SQL access, or provide SQL extensions that leverage any unique features of the host database. The data connectors also need to be downloaded and installed on each customer's client machine.

Critically, ISVs must minimize any risk associated with opening ports to provide SQL access to their application's data. This is of particular concern—and is particularly challenging—when the application is running on the cloud and the analytics tool or language access is on-premises. The ISV must build its own connectors to safely open ports in both the cloud firewall protecting the ISV's application as well as the customer's firewall. It can also be challenging to find a way to scale VPN access for multiple tenants.

The Benefits of Standards

Given the difficulties of building secure data access points, many ISVs embrace data connectivity standards as a way to support and accelerate an open analytics strategy.

For programmatic access, ISVs are increasingly turning to OData. It is an emerging standard from the Organization for the Advancement of Structured Information Standards (OASIS) that simplifies the task of creating RESTful APIs by defining a set of best practices for building and consuming them. OData lets developers focus on creating business logic without worrying about the various approaches to define request and response headers, status codes, HTTP methods, URL conventions, media types, payload formats, query options, and so on.

But a REST API may not be enough. Cloud ISVs assume they'll need to provide data access through their existing business logic or metadata layers, but many customers also want to directly query the cloud application data via SQL queries. Such direct access can provide the customer with rich new data sources for predictive and prescriptive analytics tools.

For SQL access, most ISVs support Open Database Connectivity (ODBC) and Java Database Connectivity (JDBC) data access standards. These standards might not support every function in a given database, but they support the vast majority.

Yet, even when leveraging these open standards, new accessibility requirements pose a significant development challenge for ISVs to build their own connectivity.

The Joys of Buying

Not surprisingly, a few astute vendors have seen ISVs struggle with building APIs and data connectors and have delivered packaged data connectivity software to simplify the task. For example, Progress Software, which is the sponsor of this report, sells DataDirect hybrid connectivity solutions—services that deliver a data access layer for open analytics via ODBC, JDBC, and OData interfaces. They can be run as cloud services on Amazon Web Services or can be hosted internally (on-premises or on the cloud).

Hybrid connectivity solutions like those from Progress support two primary functions:

1. **Safety.** They provide connectivity to cloud-resident databases or internal APIs for direct access from on-premises applications over firewall-friendly ports such that the ISV does not have to worry about security issues.
2. **Standard Data Access.** They provide a single, standard API for any customer to query cloud-resident data from any external application, programming language, or BI tool.

Such solutions accelerate time to market compared to building and distributing data connectivity and API software to customers.

Recommendations for ISVs

The Growing Demand for Analytics

For the past decade, there has been a steady rise in demand from customers for analytics to be embedded into the applications they use. With the advent of big data, the cloud, and the rise of machine learning, it is becoming a requirement for ISVs to provide open analytics solutions that empower customers to run advanced analytics on large data sets throughout the enterprise with the user's tool or language of choice.

Know Your Audience

To supply the customer need for analytics, most ISVs have discovered they need to adopt a hybrid approach. That is, they need both embedded and open analytics strategies to support different types of users and companies.

Operational Workers. The embedded approach pays dividends for operational business users who spend a great deal of time in the application. These could be operational analysts at a large company or general business users at a small company, such as a doctor's office that doesn't have a dedicated BI tool or data analysts. These business users benefit from an integrated solution that seamlessly blends operations and analytics.

Analytical Workers. On the other hand, the open analytics approach is ideal for data analysts and data scientists who need to query diverse sources, mash the data together, and visualize and publish their insights. Although organizations have built data warehouses to provide consolidated views of information, data analysts and data scientists typically need real-time access to granular data not stored in a data warehouse. They often need to go directly to the source, so an open analytics approach is ideal for them.

Hybrid Strategy. Of course, ISVs need to support both types of users. Thus, most adopt a hybrid strategy and embed an analytics tool as well as provide open access to the application and database. Given the work required to support both strategies, it behooves ISVs to buy rather than build BI capabilities and data connectivity software. Fortunately, the industry has matured, and there are numerous providers on the market with sophisticated solutions that are affordable and easy to implement.

Whether big or small, new or old, an ISV needs to periodically review its data connectivity strategy to ensure it is optimizing data access for customers while minimizing the time and cost of providing access to application and data resources.

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A Product Integration Partner

NetSuite determined that the best approach to address its customers' data access requirements would be to partner with a third-party ISV specializing in data connectivity and product integration. The staff members quickly narrowed the choice down to Progress® DataDirect® and the Progress DataDirect OpenAccess Software Development Kit (SDK). Among the key factors driving the decision was the extensive breadth of DataDirect support for standards and an array of implementations—some of them unique in the industry.

"DataDirect was the only company to offer a Java API to generic backend data sources," notes a NetSuite project manager.

Explicitly designed to create custom APIs based on connectivity standards, the OpenAccess SDK can essentially give developers as much as 99 percent of the code already completed. This includes the extensive driver API specification compliance, the SQL calls, and the network and server components necessary. It provides the ability to make anything—flat file data, proprietary data, or a Web site—appear as an SQL database which application tools based on standard APIs know how to talk to. The pre-built component code exposes the required APIs and interfaces and implements all the rules defined by the respective specification for various OS platforms.

"DataDirect OpenAccess provided us with pretty simple programming of 13-to-18 methods," reports one key NetSuite developer. "That translated to a quick learning curve and fast product development."

Rapid Adoption of Database Connectivity

NetSuite reports that Progress DataDirect has served not only as a vendor of excellent data connectivity components, but also as a product integration partner, providing outstanding technical support.

"The DataDirect support is great," reports one development PM. "We were able to port some old driver code to the new DataDirect version within a few days, working with DataDirect via e-mails sent from engineer to engineer for clarification. Response time was frequently a matter of minutes."

More than 300 NetSuite customers make use of ODBC capabilities deployed using the DataDirect OpenAccess SDK. These span a diverse variety of uses, including:

- A food process and packaging company that has written Crystal reports to obtain information used in helping them print shop packets and inventory pull sheets that go to the shop floor, saving them considerable time and providing information they'd never had before.
- An audio installation vendor that uses ODBC to send data to a Crystal report used to calculate commissions for their sales staff.
- An anti-virus and anti-malware ISV that uses ODBC to identify orders in a queue awaiting a license and also to create and run reports in client-and server-side applications and to extract data to populate a data warehouse.

A survey conducted by NetSuite found that more than 60 percent of its customers using ODBC capabilities in its applications gave a 4 or 5 out of 5 rating in value.

Says a NetSuite representative: "We've had our customers tell us that they absolutely need it. They've said to us: 'please don't even think of removing it'."

For more information go to www.progress.com/customers/netsuite