

# OPEN MARKET DATA INITIATIVE

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# Bloomberg

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# Open Market Data Initiative

**“Bloomberg is committed to supporting an open strategy and continuing to deliver premier content, analytics and managed services that leverage these open technologies.”**

## EXECUTIVE SUMMARY

Today’s global financial markets are fueled by the collection and processing of timely and accurate market information. To access financial markets, companies depend on unique security identifiers within reference data and real-time feeds. In large part, both market data symbologies and programming interfaces are proprietary, which can make data integration a challenge and limit a firm’s ability to migrate between different data providers. Given the high cost and risk of migration, information consumers and providers often find themselves locked into a specific vendor’s solution. Closed symbologies and restrictions on programming interfaces confine the use of existing solutions while creating barriers to entry for new marketplace participants.

Bloomberg is responding to these limiting conditions by offering open solutions that are collectively part of Bloomberg’s Open Market Data initiative (<http://open.bloomberg.com>).

In 2009, Bloomberg took the first step by releasing Bloomberg’s Open Symbology (BSYM), a flexible and truly open system for identifying securities across all global asset classes. BSYM represents an alternative to proprietary security identifiers that is growing in adoption in response to investor and institutional demand for unique and non-changing identifiers with no restrictions on usage.

Bloomberg is now addressing the problem of proprietary programming interfaces by opening the Bloomberg API, or BLPAPI, for free use under a nonrestrictive MIT-style license. BLPAPI is a proven interface that supports both publish/subscribe and request/response paradigms and is the common access point to Bloomberg market data distribution products, including Desktop API, Server API, Managed B-Pipe and Platform service products.

The BLPAPI interface is used today by thousands of applications supporting more than 100,000 daily Bloomberg users accessing both reference and real-time data. Bloomberg selected a MIT-style license for its BLPAPI because it is accepted in the open community as the least limiting, allowing for free copying and unrestricted use of the interfaces. Bloomberg customers, non-Bloomberg users, vendors and third-party application developers can now adopt the interface for their own use. The new licensing terms will promote BLPAPI’s widespread acceptance, building on its existing application base and broad pool of development talent.

This release of BLPAPI is part of an ongoing effort that seeks to unlock the value of Bloomberg services in order to make Bloomberg products more efficient and cost-effective for its customers. The pursuit of this objective has led Bloomberg to embrace and promote open solutions.

Furthermore, Bloomberg is evolving its interfaces into candidates for an open standard. Under this initiative, an independent committee would be formed to manage the future development of BLPAPI, while ensuring its stability and openness.

Bloomberg is committed to supporting an open strategy and continuing to deliver premier content, analytics and managed services that leverage these open technologies. This paper provides a survey of the open market data space and highlights BLPAPI’s key technical features.

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**“Due to this demanding environment as well as innovation driven by technology, the market data space remains dominated by proprietary interfaces.”**

## THE MARKET DATA ENVIRONMENT

The market data environment is complex and involved, including programming interfaces, symbology, and specific behaviors and conventions of the system. Ultimately, the restrictions created by proprietary interfaces and symbology have limited the contributions of the community of application developers, vendors, consultants and users, and have stifled innovation.

### Security Identification

A variety of contractually restricted methodologies for identifying financial instruments exist. These proprietary symbologies are deeply embedded in spreadsheets and applications. Migrating to another market data product requires a high-cost migration to a different symbology.

To remove such restrictions on its clients, Bloomberg has placed its symbology in the public domain. The Bloomberg Open Symbology (BSYM) is a family of security identifiers available as a nonproprietary and open security identification system:

- Full descriptions of its methodology are freely available to the entire financial community, offering any company involved in securities trading a number of advantages over closed and limited systems.
- BSYM offers a simplified symbology mapping that supports most characters, including blank spaces and periods.
- A Web-based instrument lookup service is publically available (<http://bsym.bloomberg.com>).

### Proprietary Interfaces

#### >>Emergence of Proprietary Interfaces

The demanding requirements of the market data space have forced vendors to be trailblazers relative to their information technology peers. The early days of digital market data saw the quick adoption of innovations in the areas of software messaging, networking and systems—a trend that is accelerating with requirements for reliable delivery of increasing volumes of data at ever-lower latencies.

Critical to the success of these early systems was the development of programming interfaces that supported publish/subscribe and request/response paradigms, clearly identified messaging streams (e.g., tick-by-tick market data per instrument per exchange or data source), and handled high data rates, often requiring asynchronous processing. To protect their tenuous positions in this emerging market, vendors maintained strong proprietary rights over their technologies and interfaces.

Due to this demanding environment as well as innovation driven by technology, the market data space remains dominated by proprietary interfaces. Application developers at financial firms as well as third-party vendors find themselves tightly coupled with these interfaces.

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**“Proprietary interfaces imposes a barrier to entry for other vendors.”**

## >>Limits of Proprietary Interfaces

A programming interface that is proprietary severely limits the options for firms that use them. Typically, a proprietary interface is contractually tied to the associated product. If the client decides to stop using the product, any references to the interface must be removed from the client’s applications. Further, the proprietary interface may not be copied and used for any other purpose, even if the firm remains a customer of that vendor for other uses. Together, these restrictions prevent the creation of adapters that could mitigate the costs and risks of migration.

Given such restrictions, attempts to introduce products from alternative vendors or from internal sources require that existing applications migrate to a separate interface. Such migrations are rare in this industry because of the risks and costs involved. Essentially, a firm’s investment in proprietary interfaces imposes a barrier to entry for other vendors.

A proprietary interface may become the de facto standard. Such de facto standards create a semblance of community by encouraging third-party vendors to offer complementary products, but the proprietary interface does not allow a third-party vendor to adopt it for their own products, thus severely restricting the community.

## Vendor-Independent Interfaces

### >>User Efforts

Financial firms embraced new technologies because of competitive pressures, despite the drawbacks of proprietary solutions. Very early they recognized that they were binding themselves to a particular vendor, so various attempts were made throughout the industry to mitigate the problem. Many of the early-adopting firms committed significant resources to creating their own interfaces and developed adapters to hide the underlying vendor’s API. Theoretically, these adapters (sometimes known as “Vendor Independent API” or “Abstraction Layer”) would support multiple existing vendors and could be extended to support new vendor APIs as they emerged. The goal was to separate applications from the details of any vendor’s interfaces, thereby providing an easy migration path between vendors. At best, these efforts had limited success.

In the rapidly moving environment of an investment bank, extraordinary discipline is required to strictly enforce the use of a vendor-independent adapter. As vendors expand their interfaces to support new features, temptation is strong within application groups not to wait for the adapter to cover that feature. Support issues create more opportunity for conflict with an additional software layer inserted in the mix. Since nothing prevents an application group from using a vendor’s interface directly, many applications avoid the adapter out of ignorance or expediency. Over time, many firms end up with a significant number of their applications using the vendor’s proprietary interface directly instead of the adapter, thus undermining the original purpose of the vendor-independent interface.

Successfully implementing and supporting these vendor-independent APIs proved onerous and costly. Covering all current and future features of multiple vendors’ publish/subscribe APIs became impractical, especially in the face of vendor resistance. Further, these adapter efforts were still proprietary to the firms creating them, limiting their usefulness and impact.

### >>Partnership Attempts

Companies found maintaining their in-house vendor-independent adapters an expensive choice. Vendors, understandably, did not cooperate in these efforts, leading financial firms to form partnerships on their own to create a common interface. The most visible early effort (circa 1992) was undertaken by Electronic Joint Venture Partners (EJV), a consortium made up of large investment banks. This attempt failed because the major vendors would not participate and also because of the competing interests of the partners. More recent efforts have been made to create adapter layers—however, none have been supported by a vendor with a proven interface and a large established client base.

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**“The Bloomberg Open Market Data Initiative places what are now considered commodity technologies—symbology and open market data programming interfaces—firmly into the open domain.”**

## **BLOOMBERG’S OPEN MARKET DATA INITIATIVE**

Bloomberg is pursuing an Open Market Data Initiative with its Enterprise Products and Services offerings, which include Desktop API, Server API, Managed B-Pipe and Platform. Bloomberg’s focus is on providing premium data and compelling services to customers without imposing artificial restrictions on client applications. The Bloomberg Open Market Data Initiative places what are now considered commodity technologies—symbology and open market data programming interfaces—firmly into the open domain. The initiative will create a dynamic community around market data systems, encouraging new innovation and cooperation between vendors and clients.

In 2009, Bloomberg released its financial instrument symbology into the public domain with BSYM. Bloomberg is now making the BLPAPI interface “free-use” by distributing its header files, documentation and programming examples under a MIT-style license. Specifically, Bloomberg is allowing clients and other parties to freely use interfaces for C, C++, Java, .NET, COM and Perl. The new license also allows header and library files needed to compile client applications to be copied to facilitate testing and evaluation.

The BLPAPI interface is widely used among Bloomberg’s clients—with thousands of BLPAPI applications already written that support more than 100,000 regular users. Free-use licensing allows clients, consultants and other third-party vendors to adopt BLPAPI’s comprehensive and highly regarded interfaces for their own market data service implementations, as well as use them in applications and adapters. Bloomberg sees this release as the first step in creating a compelling programming interface that is based on open standards.

BLPAPI’s future direction is to evolve into a candidate for an open standardization process. This effort is beginning as Bloomberg starts working with vendors and clients to review and update the interface for open use. An independent standards committee made up of vendors and end-user firms, will be formed, with a mandate to promote the interface to the community and to provide a stable forum for an open and deliberative process for the ongoing evolution of the interface standard. This process will take into consideration both the community of existing users and the potential needs of future users. The committee will set the stage for open source implementations of the interface, as well as the creation of standards-compliance tests.

With BSYM and free use of its interfaces, Bloomberg is making a clear commitment to providing applications with an unfettered access to market data distribution platforms through open systems.

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## BLOOMBERG BLPAPI

BLPAPI is the programming interface for Bloomberg's Desktop and Server API, Managed B-Pipe and Platform service products. The interface is designed to have maximum flexibility. An explicit requirement was to serve both customers' market data applications as well as Bloomberg's own Desktop suite, including the Microsoft Excel® plug-in. From the outset, this required supporting diverse types of data: subscription data for pricing, historical and intraday tick data, and reference data (both scalar and tabular). With interfaces for publishing pricing data and bindings for additional programming languages, BLPAPI is a comprehensive market data interface. The rest of this section describes its key technical features.

### BLPAPI Overview

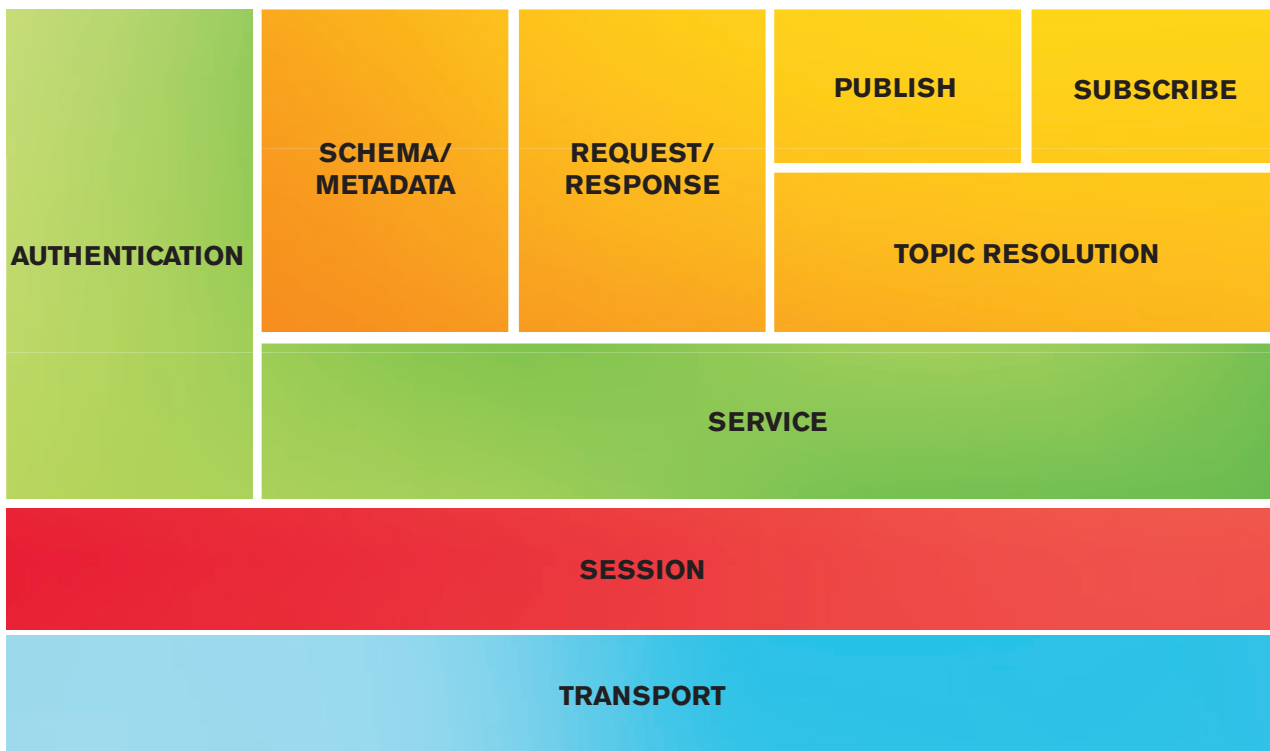


Figure 1. BLPAPI Interface Components

### >> Flexible Service-Based Architecture

The concept of a service is central to BLPAPI. The interface supports the subscription and request/response paradigms but is not tied to any specific data dictionary, event model or symbology.

Services are fully specified using schemas, which can be dynamically configured and introspected by applications. Multiple services can share common data dictionary elements, thus allowing them to be used as building blocks within a larger market data ecosystem. Powerful functionality can be easily achieved by managing the service metadata. For example, the implementation of the Bloomberg Platform product uses the service metadata to determine whether the subscription recaps should be provided directly by the infrastructure or by publishers themselves.

When establishing a subscription, the client proceeds through a “resolve” step in which subscription topics may be resolved to canonical names. This provides another powerful abstraction, since it allows a market data supplier to work internally with normalized subscription “topics,” regardless of how they were requested by individual users or applications. For example, one user may identify securities via CUSIP and another via ISIN; once their subscriptions are set up, they will receive the same data stream. The resolve step also allows for event filtering based on fields or type of event if these are specified together with securities.

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**“The BLPAPI interface is comprehensive, clear and simple to use.”**

The interface's service orientation further allows pub/sub applications to be agnostic to the location of their destination or sources. Different groups within Bloomberg have followed this model in ways that did not depend on their being “internal” to the firm. Bloomberg's Trading System products created a request/response service (logically synchronous) for order submission, with a corresponding subscription providing order fills asynchronously. Technical Analysis and “intraday bar” services were likewise built on top of a pricing feed.

## **>> Centralized Symbolology Management**

The service's topic resolution step frees applications from needing to implement their own symbolology mapping solutions. If a service offers a full-featured symbolology lookup, applications can easily leverage this.

## **>> Simple Things Are Simple**

Usage examples came to the forefront during the early design of BLPAPI, and a rich set of sample programs provided with the SDK gave the skeletal beginnings of many customer applications. Specifying relevant options at the service, session and subscription levels makes for terse, easily modified client applications.

## **>> Multiple Language Bindings**

The BLPAPI SDK includes a comprehensive set of bindings for C, C++, Java, .NET, COM and Perl, supported on Linux, Windows and Solaris. The Java binding is implemented in native Java (not using JNI), allowing for truly platform-neutral client applications. The BLPAPI.NET implementation is fully managed within Microsoft CLR (Common Language Runtime), leveraging its memory management, type safety and exception handling.

## **>> Support High-Volume, Low-Latency Implementations**

The BLPAPI interface supports both synchronous and asynchronous processing, allowing an implementation to scale to ever-growing data rates by efficiently supporting event-driven and multi-threaded client applications.

At a lower level, BLPAPI interfaces were designed to allow messages to be constructed and processed efficiently, with in-place parsing and composition, with a minimum number of copies. Sophisticated communication patterns between client and server are possible, with support for partial responses. At the same time, the interface does not impose arbitrary restrictions on message content (e.g., no limits on request size).

## **>> Full-Featured Infrastructure**

The BLPAPI is a comprehensive definition of a market data interface. It includes publish/subscribe, request/response paradigms, and service streams. In addition, the BLPAPI interface includes authentication that allows the implementation to positively identify the source or the consumer of the data, which, in turn, enables the ability to permission and entitle any usage. With many market data distribution environments, permissioning is a critical feature as contractual obligations such as exchange fees are involved, and management requirements, including resource allocations, are in place. The authentication interface in BLPAPI is extremely flexible, allowing a wide range of authenticating credentials to be implemented and accepted. For example, the BLPAPI implementation supports strong permissioning requirements for Bloomberg Professional Terminal users, as well as fairly relaxed requirements for applications.



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## >> Canonical Messaging

Data is exposed to applications without exposing details of the wire format or underlying transport through self-describing messages containing strongly typed data (e.g., integer, floating point, string) together with field descriptions. Data elements may be simple (e.g., a price) or complex (e.g., time series pricing or a coupon payment schedule for a bond). For example, reference data is implemented with its own service, data schema and metadata, separate from real-time market data.

## Use Case: Request/Response

The BLPAPI interface is comprehensive, clear and simple to use. This section illustrates the use of the request/response interface to obtain reference data.

The first step is for the application to establish a session with the server. This is trivial if authentication is not required as the following sequence diagram shows:

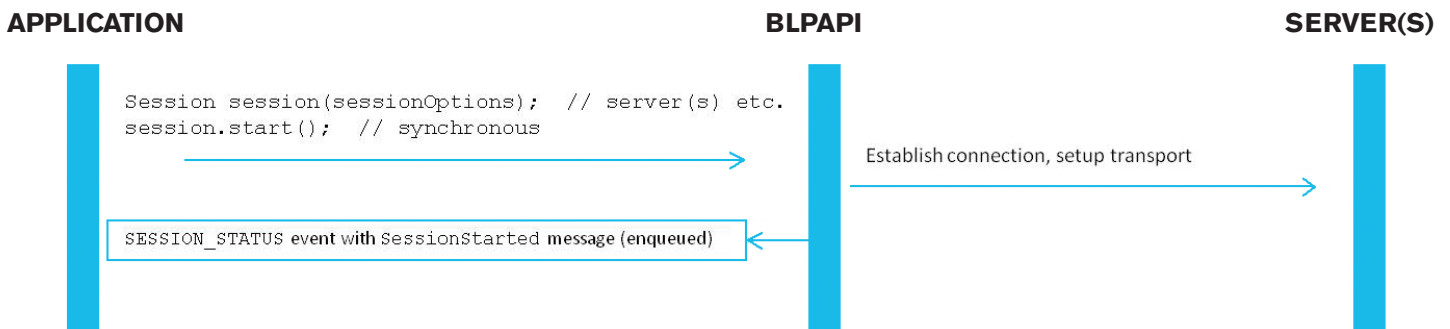


Figure 2. Session establishment (using synchronous API)

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In the next step, a synchronous request is made for specific fields for a single security. Note that the service needs to be opened only once, no matter how many requests are made. The response(s) provide the requested information, and the use case is complete:

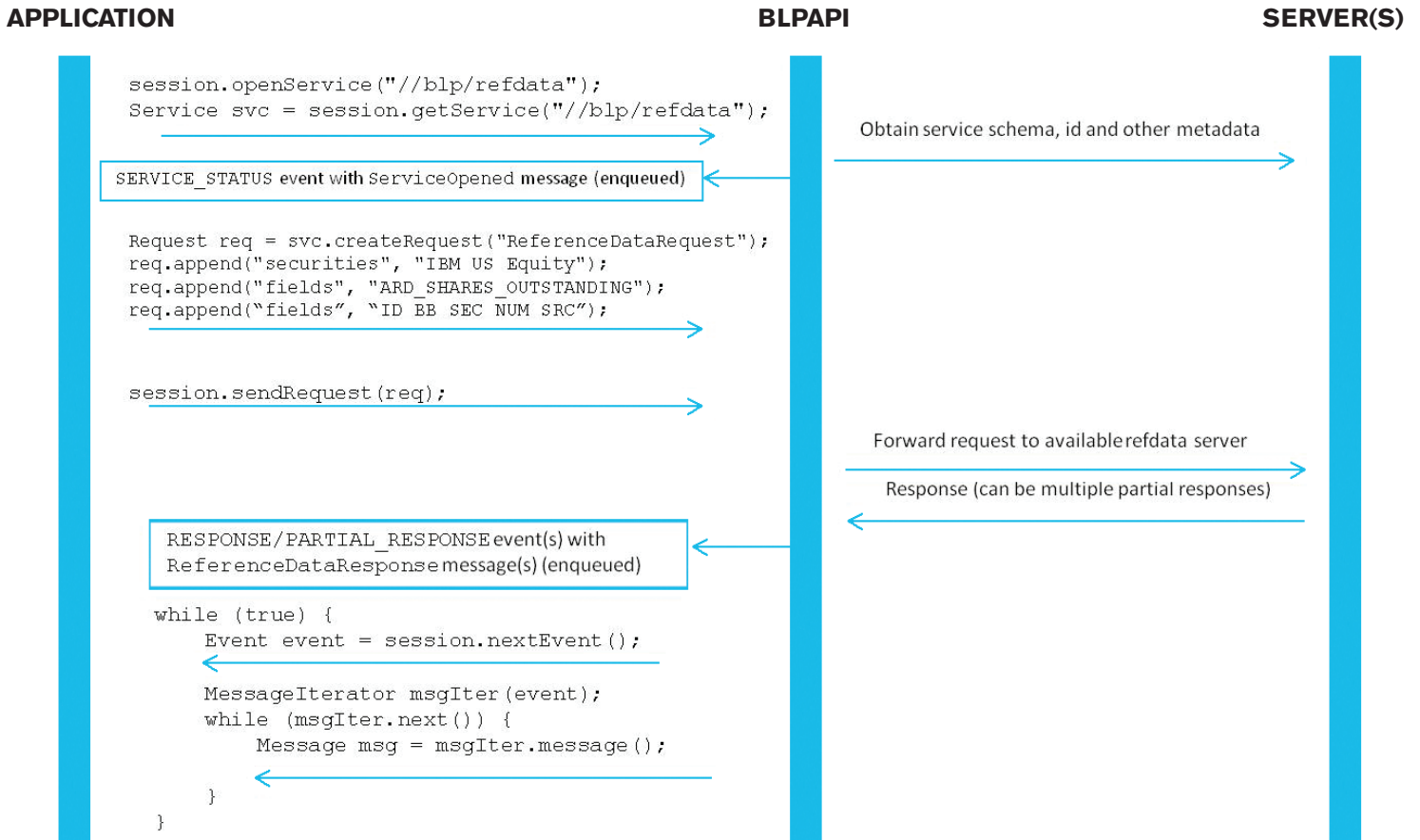


Figure 3. Reference data request/response

Requests are, by definition, asynchronous. Asynchronous operation is also supported for session establishment and for opening services (e.g., above, using the `openServiceAsync` interface).

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## Use Case: Subscription Data

This section illustrates an asynchronous subscription to real-time market data (publish/subscribe paradigm). The initial value (i.e., recap) is delivered as an event callback, as are the subsequent real-time updates. The application's event loop is not shown but is the same as shown in Figure 3 for the request/response mode:

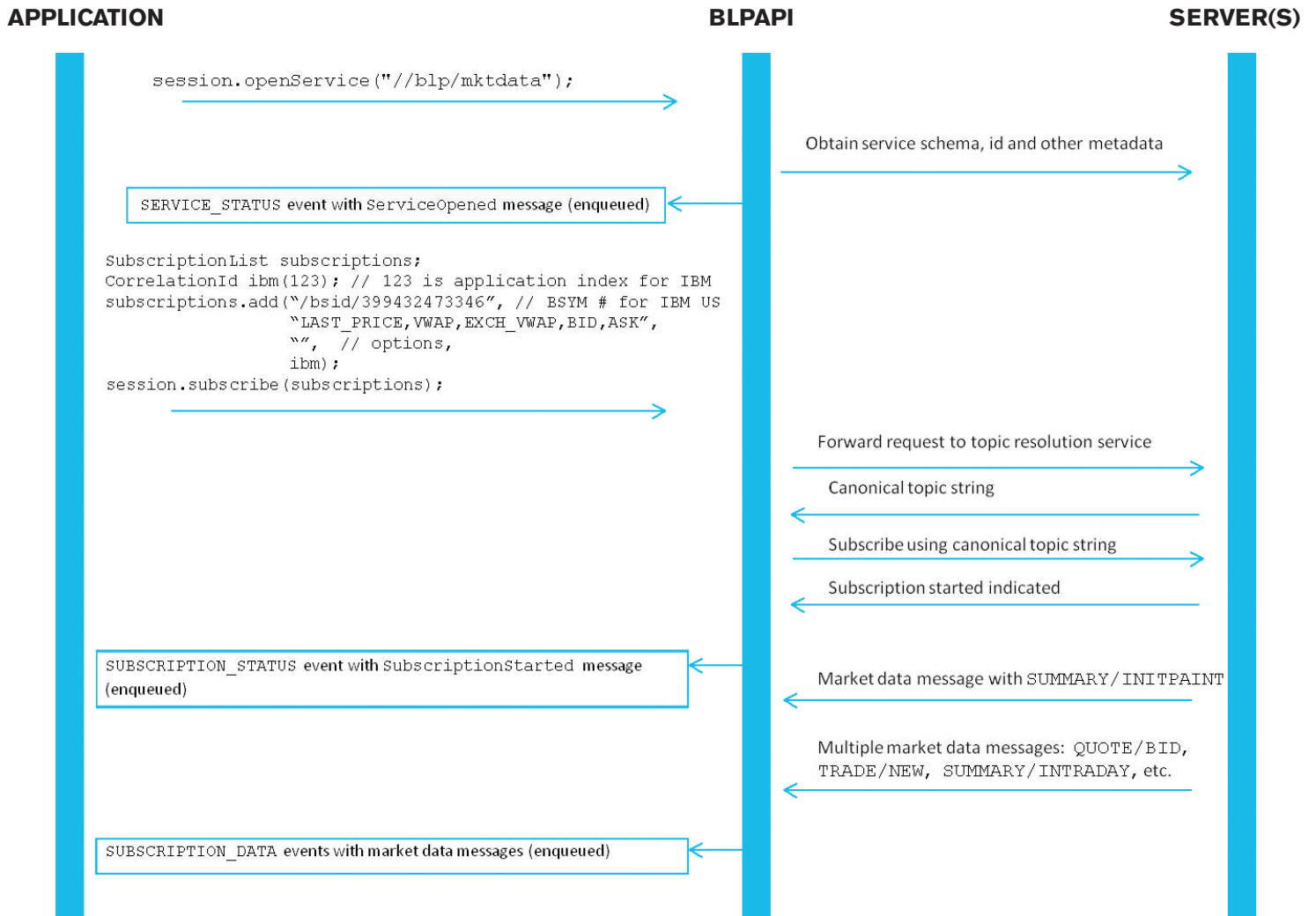


Figure 4. Real-time subscription data

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**“It is Bloomberg’s belief that restrictions and barriers enforced by proprietary symbology and interfaces are no longer acceptable.”**

## **THE FUTURE: INDUSTRY STANDARDS FOR MARKET DATA**

When digital distribution of market data was a new technology, it was understandable that vendors protected their symbology and programming interfaces with proprietary licenses—technology innovations that were new and unique. At the time, this intellectual property was their core product.

The market data environment is now mature and these technologies are well-understood. The differentiating factors have shifted to the data and analytics products themselves, not their delivery mechanisms. The industry is moving to an open model, which will force vendors to compete on customer-centric terms. Open technologies will create a true community, encouraging the next round of innovation while lowering costs and vastly improving time to market of new products for both vendors and end-user applications.

Bloomberg is committed to openness in the market data environment as demonstrated by the release of its symbology and the free-use licensing of its programming interface. Bloomberg will follow these efforts by creating partnerships with vendors and clients to produce an open standard interface and release an open-source reference implementation. It is Bloomberg’s belief that restrictions and barriers enforced by proprietary symbology and interfaces are no longer acceptable.

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## APPENDIX – BLPAPI LICENSE TEXT

### Header Files and Example Code

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To learn more about the Bloomberg Open Market Data Initiative, visit [open.bloomberg.com](http://open.bloomberg.com). Questions and comments about BLPAPI can be sent to [open-tech@bloomberg.net](mailto:open-tech@bloomberg.net). Questions and comments about BSYM can be sent to [bsym@bloomberg.net](mailto:bsym@bloomberg.net).

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