Progress®

OData: The Fastest Way to RESTify Your Databases

WHITEPAPER

Executive Summary

Anyone involved in the data pipeline, whether for ingestion, management, transformation, governance or analytics, must deal with enterprise data in the cloud and behind the firewall.

Traditionally, data warehouses (and later, data lakes) have been adopted to close the gap between these two silos and make all data available. But these solutions are time-consuming, costly and batch-oriented—a concept that is fast becoming archaic for global organizations. In addition, these data access patterns require moving or copying data.

As incoming data volumes grow and their sources become more disparate, the REST API is becoming increasingly popular for accessing enterprise data from web and mobile applications, as well as modern programming languages.

But are REST APIs good enough? REST is just an architectural style. That means every REST API is different. So, every time you have a new use case, you have to create a new client codebase to access the new database endpoint.

The international standard—OData—eliminates this problem by defining a set of best practices to build and consume REST APIs. Using this industry-standard architecture enables you to easily add capabilities in the future without increasing your IT burden.

Read on to explore the advantages of RESTifying your databases via OData. But first, let's look at the rise of APIs and what that means for your business.

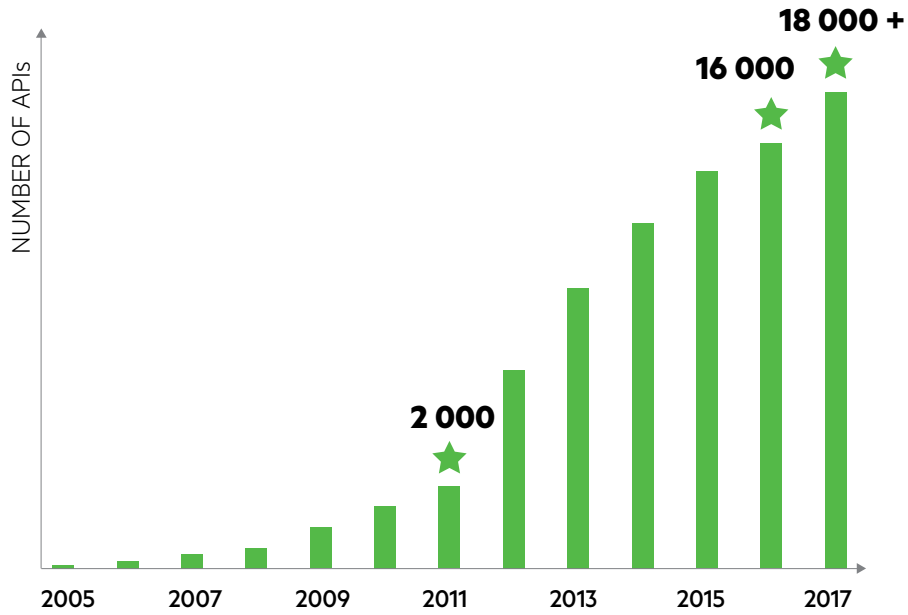
The Rise of APIs

It used to be that APIs (Application Programming Interfaces) were simply a way for software developers to access functionality from other applications. With the pervasive growth of web and mobile applications, and the service-oriented design of applications, APIs have become widespread. APIs are used for integration and data exchange, and are now vital tools for transforming businesses.

More and more businesses are unlocking valuable assets and making them available through APIs. Often the API demand is driven by the need for mobile, web and cloud applications to access internal data and business processes.

The new API economy is all about moving into new markets, creating new products and business models and delivering a seamless digital experience to customers. And APIs are the fuel that can make this all happen.

As of 2017, the number of public APIs surpassed 18,000—an increase of 2,000 APIs over the previous year.



60 MONTHS TO THE FIRST 2000 APIs

12 MONTHS TO THE LAST 2000 APIs

125 APIs PER MONTH

Advantages of REST APIs

The many advantages of standardized APIs have led to their increase in popularity among both developers and business decision-makers. Product managers appreciate the ability to decouple code from the database so users don't need to know about the underlying data. You can even switch the database altogether and the user doesn't need to change anything.

REST APIs deliver faster time to market by taking advantage of the well-known HTTP protocol to simplify development and break down large applications into smaller modules. This enables teams to iterate faster, providing new functionality through new versions of the API. Data managers can focus on ensuring the scalability and reliability of their data and using advanced SQL features when appropriate, while developers focus on writing the REST API, which is simple and doesn't require a lot of coding. This separation of roles speeds development and innovation.

REST APIs also deliver interoperability. Since all modern programming languages support HTTP/HTTPS, they inherently support REST. This ubiquitous connectivity ensures emerging programming languages will support your REST API, and eliminates client drivers and complex proprietary networking. Plus, REST APIs use JSON for data exchange and most modern programming languages support JSON, such as Java, C#, JavaScript, PHP, Python and many more.

Finally, REST APIs provide additional layers of control. Because REST abstracts the underlying database, it gives DBAs another layer of control over security and performance for controlling data access and monitoring resources. A REST API layer also makes it easy to throttle the data requests. This can help improve your application performance significantly.

Key Advantages of REST APIs

- Decouples applications and data
- Uses same operations as HTTP
- Better supports microservices architecture
- Separates development and data access roles
- Uses JSON for data exchange
- Works with your programming language of choice
- Provides additional layers of control
- Enables throttling

Time to RESTify Your Database

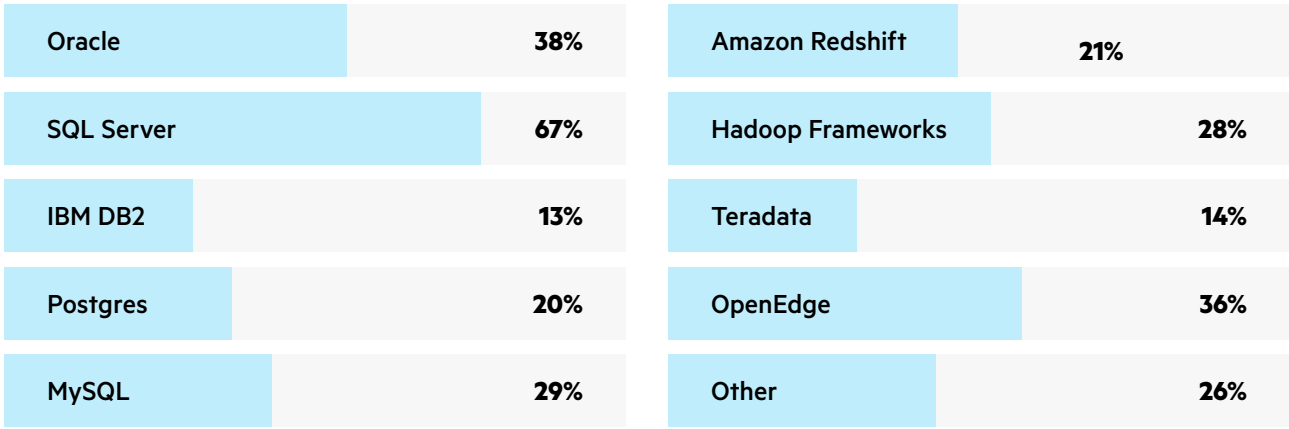
The explosion of APIs has made more data available, but not necessarily available over the web. REST APIs are the modern API for the web. Of course, securely accessing data from web and mobile applications is a challenge confronting every organization in every industry. Users expect to have fast, accurate, secure data available at their fingertips.

REST APIs enable you to leverage existing investments in data storage while securely opening that data to web and mobile apps, without actually moving or copying the data. The HTML5, web or mobile application can access the data in real-time via the REST APIs.

What Data Sources Are Most In-Demand for REST Enablement?

At a recent webinar, we polled participants to see what data sources they need to REST-enable. The two sets of answers are below:

Which of the following databases are of interest to REST enable?



Among our webinar attendees, the most popular data sources to RESTify were SQL Server, Progress® OpenEdge®, MySQL and Hadoop Frameworks.

While relational data stores such as Oracle, SQL Server and DB2 are often labeled as "legacy," this poll verifies our experience that the vast majority of businesses in the world still run on the largest relational databases. The movement toward web and modern applications doesn't replace the need to use traditional relational data. REST opens a new way to access traditional and modern data sources with new, cutting-edge applications.

Databases Have Started Moving Toward REST APIs

The trend toward RESTifying databases can be seen across the industry. That's because companies have built business applications on top of these databases and now require modern apps to access this enterprise data.

The most recent cloud-hosted databases are starting their API journey with REST. Among them, Google is a big adopter. The company offers a REST API for Cloud Datastore, Firebase and BigQuery to support programmatic interactions.

Similarly, the Azure DocumentDB API provides rich and familiar SQL query capabilities over schema-less JSON data. Azure also offers a one-click OData endpoint to any of its SQL Azure databases. Of course, Salesforce is a great advocate of APIs as well. With its database.com, you can query the data using REST.

Cloud-Hosted Databases

Google Cloud

Azure

Database.com

IBM Cloudant

...

On-Premises Databases

Oracle REST Data Services

Teradata REST API

IBM DB2 Rest Services

MarkLogic RESTAPI

...

On-premises databases such as recent versions of Oracle, Teradata and DB2 offer REST services that enable their data to be accessed from all the modern languages. SQL Server is halfway there; the database offers libraries to convert raw data to and from JSON, but you'll have to write your own web service. It doesn't have a prebuilt solution.

But REST Is Not Enough...

While REST enables you to open data to web and mobile apps, it's still just an architectural style. That means every REST API is different. So, you need a different client codebase for every database, which is fine if you don't have more than one database you want to RESTify.

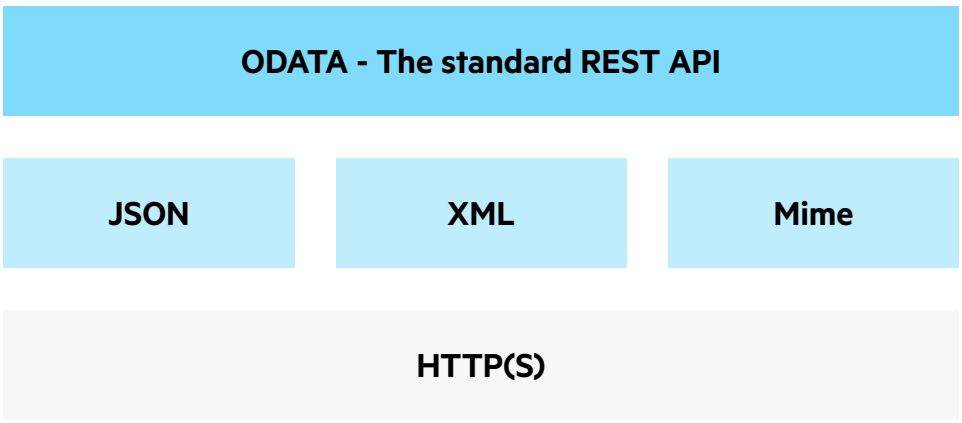
For example, let's say your sales team wants to access data from Oracle E-Business Suite from an internal mobile app. So, you allocate some resources and create the code to consume the ORDS endpoints.

Later, you need to access data from Teradata. While you can leverage the Teradata REST service, the existing client code that you created earlier cannot be reused. That's because both these REST endpoints are entirely different. You need new lines of code to access Teradata. And you'll need new lines of client code for every additional new data source.

And that's exactly what OData can solve for you.

OData Is The Standard For REST

OData is essentially SQL for the web built on top of standard protocols - HTTP, JSON & ATOM - while leveraging the REST architecture style



OData Standardizes the Way We Build and Consume REST APIs

OData is a REST-based protocol for querying and updating data in a simple and standard way. It's built on technologies like HTTP, ATOM/XML and JSON. While every database REST API is unique, OData is both an industry standard and an international standard, and is sometimes called "SQL for the web."

OData works by mapping its constructs and query options to database and SQL constructs. Likewise, HTTP methods map to OData REST operations and SQL commands.

OData is more flexible than other REST-based web services and provides a uniform way to describe the data and the data model for easy interoperability between data sources, applications, services and clients. Similar to ODBC and JDBC, OData gives you a single way of accessing various data sources.

Broad Adoption for OData

Applications such as Tableau, Salesforce, Tibco, Progress Telerik®, Informatica, Excel, Board and many more consume OData—and the list is growing, as shown below:

Why Are Companies Using OData?

Each proprietary database API is different in terms of authentication, metadata, and accessing and querying data. When you have to deal with many of these APIs individually, this means more effort spent on development, testing and maintenance. With OData, you can write a common piece of code for all data sources, which enables you to improve productivity and focus on more important projects.

In addition, OData makes it easy for other developers to access your data without learning a new API. This simplifies the process of integrating with different applications, thereby making the life of the user much easier.

OData enables you to standardize data access across your own proprietary REST-enabled data sources, plus any other RESTified sources, including Oracle, SQL Server, Hive and others.

Learn More about OData

Expose Enterprise Data to Popular Applications

In the mid-2000s, SaaS apps became very attractive for enterprises because IT didn't have to worry about installations or maintenance anymore. Apps like Salesforce, Google Analytics and NetSuite were pioneers in getting IT comfortable with SaaS apps. Today, applications such as Salesforce, Power BI and Oracle Service Cloud 2 dominate the market while cloud platforms such as AWS, Azure and Google Cloud Platform have made moving internal business apps to the cloud easy, secure and cost-effective.

However, as business-critical functions moved to the cloud, enterprise databases could not be accessed from outside the network. In this hybrid environment, you need migration or replication tools or a gateway service to access the on-premises data. But with increasing data governance laws, sensitive data can't be moved outside the network.

The best way to integrate enterprise data with the cloud is OData. With REST and OData, everything becomes cloud ready. REST is based on internet technology, in particular HTTP. And its stateless operations make it extremely simple and scalable. OData standardizes access to REST APIs across multiple data stores, and is well suited for both on-premises and mixed hybrid cloud deployments.

Data Residency Requirements

Many governments are becoming extremely strict about regulating access to data and ensuring privacy. New rules continue to be introduced, existing rules are constantly changing and all this must be reflected immediately in business processes.

For example, organizations in the European Union will face heavy fines if they don't comply with General Data Protection Regulations (GDPR). So, companies are reluctant to accumulate all this data in a lake or warehouse and make it available to many end users.

The modern data access method leaves data in place while connecting to it via OData, creating a virtual data lake.

Make Enterprise Data Accessible from Multiple Clients

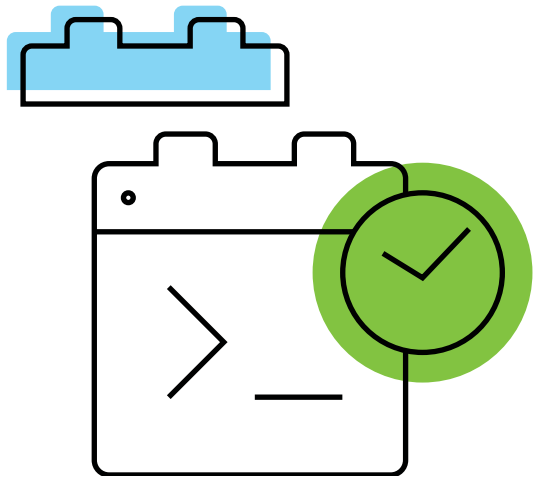
End users expect a seamless experience across every channel. They want to access your data from web browsers and any device of their choice with equal ease. OData and REST can expose your enterprise data through JSON, which can be natively consumed by web and mobile. The database is accessed just like any other web resource.

All of this means that modern programmers can now work with their tools of choice and deliver an omni-channel experience that will improve the end user experience.

How to Get Started with OData

You can develop your own OData services to build a REST API over your database; there are a number of open-source OData libraries available. For example, odata.org/libraries has several projects for building OData applications for .NET such as RESTier, ODataLib, ASP.NET Web API OData and AdaptiveLINQ. For Java applications, you can use Apache Olingo, SDL OData Frameworks, Odata4j, Jello Framework and ODataJClient. For JavaScript, you can use Node-odata, DevExtreme, o.js, OpenUI5, JayData and Breeze.js. Other libraries are available such as ODataCpp (C++), Pyslet Python Package and more.

However, none of these libraries are a complete solution and writing the code is time-consuming and difficult to maintain as data sources and database REST APIs change.

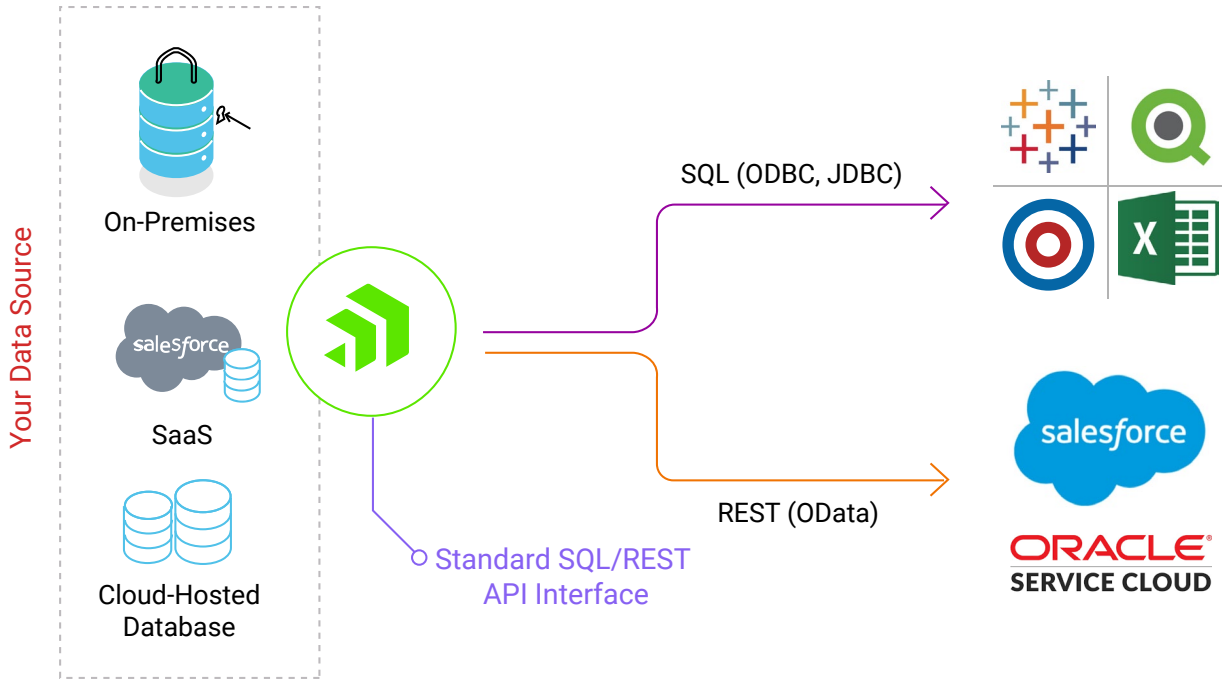


A Single Interface to Create OData Endpoints

To overcome these challenges, Progress offers a single point of OData configuration for all data sources. Called Progress DataDirect® Hybrid Data Pipeline, this lightweight data access platform gives you a single interface to create OData endpoints for your data stores. Your applications can securely connect to that data in real time—whether in the cloud or on premises behind the firewall.

Hybrid Data Pipeline is an enterprise software package with white-labeling capabilities, not a subscription service with ongoing monthly fees. Installation, configuration and security is under your control. Install Hybrid Data Pipeline in your own cloud, on your preferred cloud platform or behind the firewall. This location control helps you comply with data protection/privacy laws such as GDPR. Data is accessed securely across corporate firewalls without VPN or SSH tunneling.

With Hybrid Data Pipeline, you don't have to wait for the results generated by batch processing or collecting data in lakes or warehouses. Data is accessed in real time for those applications that require live data streams, such as analytics, ecommerce, Point-of-Sale (POS) systems and customer service.



Advantages of Hybrid Data Pipeline

- RESTify your databases without any coding
- Keep sensitive data securely in place behind the firewall
- Access all your data from web browsers, modern devices and languages
- Use OData's powerful query capabilities, even if the data source API doesn't support them
- White label and embed into your app for a seamless customer and end user experience
- Configure security to be compliant with FIPS-140 and FedRAMP
- Set limits on resources consumed with configurable API throttling

Hybrid Data Pipeline provides on-demand access to your core systems so you can quickly get up to speed and win in the API economy. Easily access data across a wide range of REST sources with standardized OData capabilities.

Get started with Hybrid Data Pipeline today

About Progress

Progress (NASDAQ: PRGS) offers the leading platform for developing and deploying mission-critical business applications. Progress empowers enterprises and ISVs to build and deliver cognitive-first applications that harness big data to derive business insights and competitive advantage. Progress offers leading technologies for easily building powerful user interfaces across any type of device, a reliable, scalable and secure backend platform to deploy modern applications, leading data connectivity to all sources and award-winning predictive analytics that brings the power of machine learning to any organization. Over 1,700 independent software vendors, 100,000 enterprise customers and 2 million developers rely on Progress to power their applications. Learn about Progress at www.progress.com or +1-800-477-6473.

Rev 2018/02 | RITM0016981

Progress®