Swagger REST API Demo

July 2019

Swagger REST API

Customer Challenge

Allow for disadvantaged users to have access to data sources like any other user.
Hide/veil queries from data source systems.
Query and update data using REST APIs

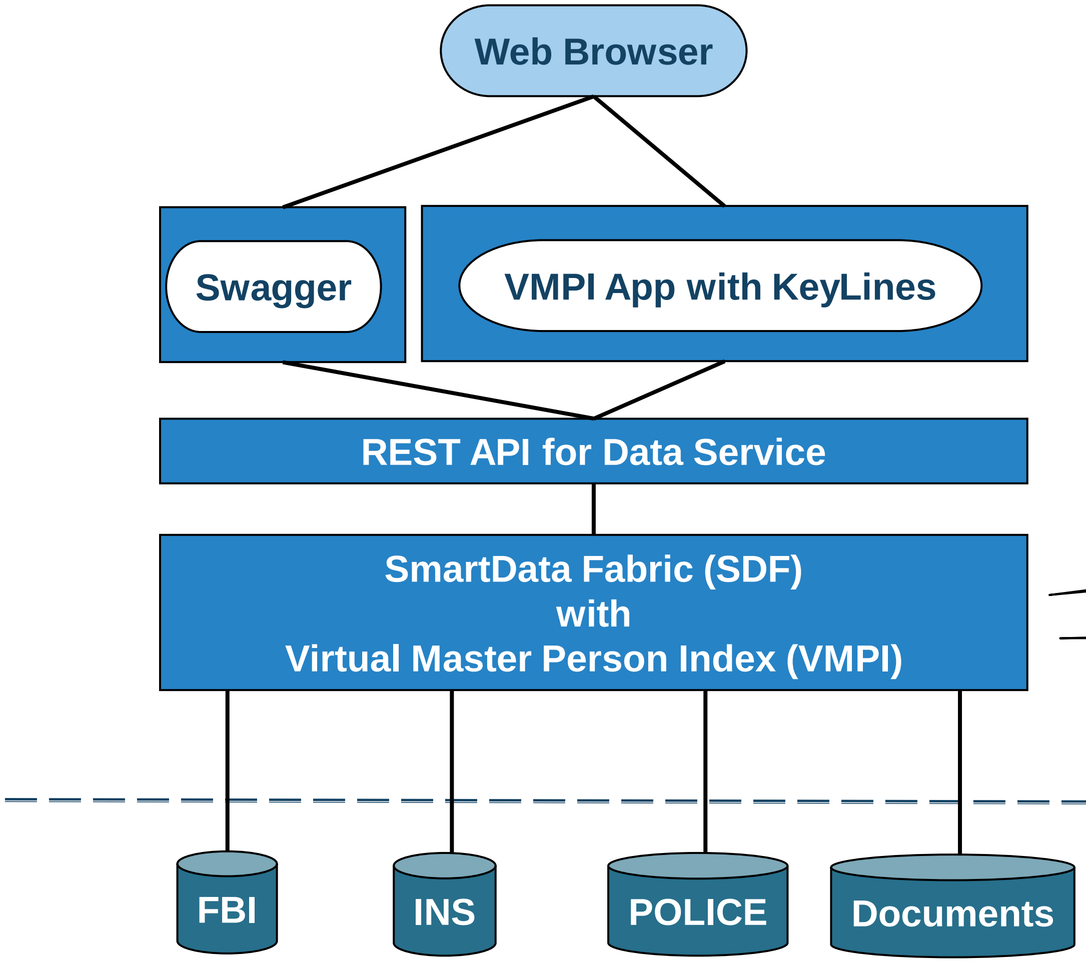
Index-based Data Virtualization Solution

Show paginated results on aggregate queries ordered by importance.
Show reading drilldown data as needed and paginated.
Query execution times also demonstrate how indexed views help performance.
Use populated indexed views to provide results without accessing data sources.
Use highly sensitive queries that can use index inversion for when data sources are unavailable.

Disadvantaged users

- Little bandwidth required for queries – results data can take time, depending on volume/available bandwidth
- Compress and secure data – vulnerability over TSL – Enveil?
- Paginate results – highest priority first DEMO
- Parallel distributed processing – pushing compute to the edge DEMO
- Rely on pre-aggregated, pre-calculated and pre-joined data (indexed views) updated as indexes updated DEMO
- Data sources unavailable, invert indexes to provide results data
- Drilldown without needing all the data – on-demand results data retrieval DEMO

Deployment stack for Swagger REST API and VMPI demos



Technologies

Web Service:	http://localhost:8080/
Web Server:	Apache Tomcat
VMPI App:	HTML5, CSS, Bootstrap, JavaScript, JSON, KeyLines Graph Visualization
REST Client:	Swagger

REST API: Spring IO (Java)
Access Driver: JDBC for SDF

Combine structured and unstructured queries in single SQL statement

SDF Federation Server
One SDF Adapter per data source
Access Drivers: ODBC for SQL Server

Entity extraction on unstructured data

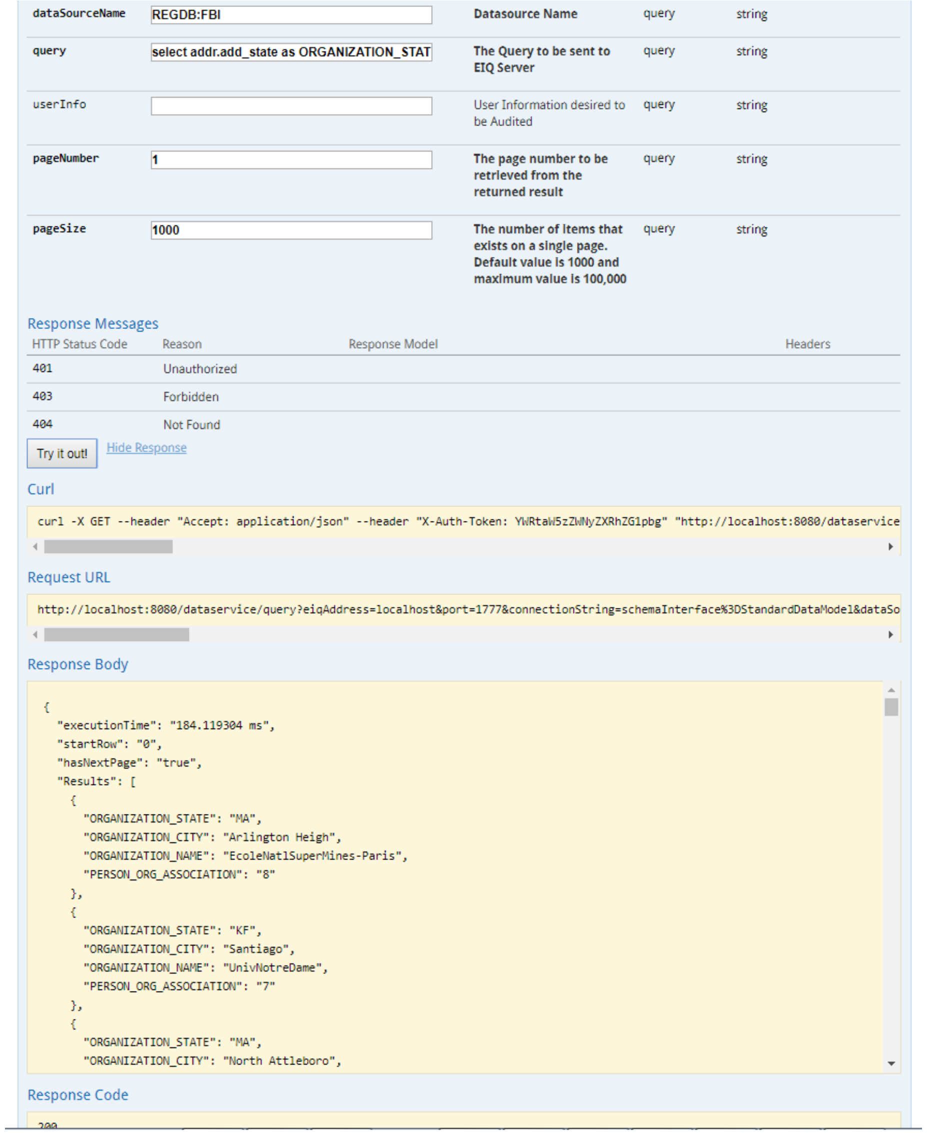
Structured and unstructured data

FBI, INS and POLICE test datasets in SQL Server
Documents on a file system

Swagger REST API demo scenario

- Show paginated results on aggregate queries ordered by importance
- Show reading drilldown data as needed and paginated
- Query execution times also demonstrate how indexed views help performance

Swagger REST API demo screenshot (1 of 3)



dataSourceName	REGDB:FBI	Datasource Name	query	string
query	select addr.add_state as ORGANIZATION_STAT	The Query to be sent to EIQ Server	query	string
userInfo		User Information desired to be Audited	query	string
pageNumber	1	The page number to be retrieved from the returned result	query	string
pageSize	1000	The number of items that exists on a single page. Default value is 1000 and maximum value is 100,000	query	string

Response Messages

HTTP Status Code	Reason	Response Model	Headers
401	Unauthorized		
403	Forbidden		
404	Not Found		

Curl

```
curl -X GET --header "Accept: application/json" --header "X-Auth-Token: YWRtaW5zZWNyZXRhZG1pbg" "http://localhost:8080/dataservice
```

Request URL

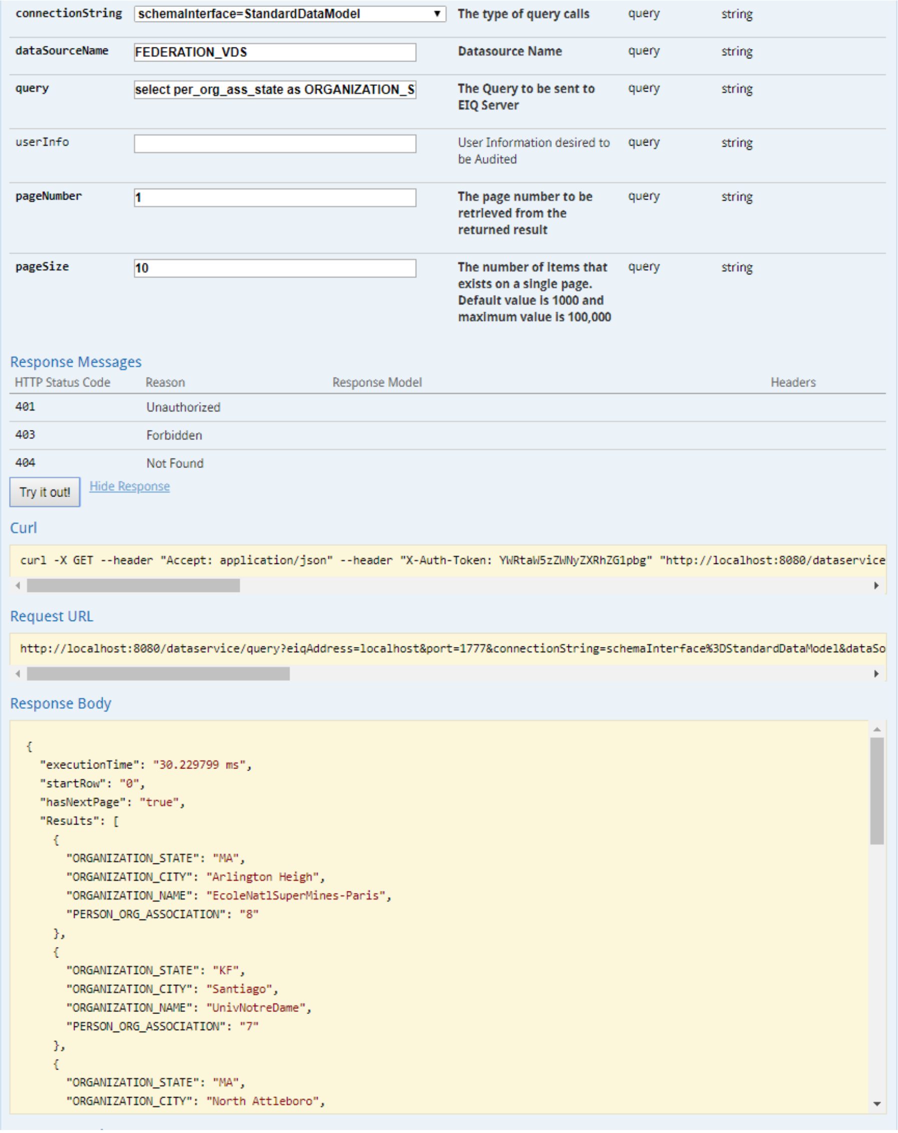
```
http://localhost:8080/dataservice/query?eiqAddress=localhost&port=1777&connectionString=schemaInterface%3DStandardDataModel&dataSo
```

Response Body

```
{
  "executionTime": "184.119304 ms",
  "startRow": "0",
  "hasNextPage": "true",
  "Results": [
    {
      "ORGANIZATION_STATE": "MA",
      "ORGANIZATION_CITY": "Arlington Heigh",
      "ORGANIZATION_NAME": "EcoleNatlSuperMines-Paris",
      "PERSON_ORG_ASSOCIATION": "8"
    },
    {
      "ORGANIZATION_STATE": "KF",
      "ORGANIZATION_CITY": "Santiago",
      "ORGANIZATION_NAME": "UnivNotreDame",
      "PERSON_ORG_ASSOCIATION": "7"
    },
    {
      "ORGANIZATION_STATE": "MA",
      "ORGANIZATION_CITY": "North Attleboro",
```

Response Code

```
200
```



connectionString	schemaInterface=StandardDataModel ▾	The type of query calls	query	string
dataSourceName	FEDERATION_VDS	Datasource Name	query	string
query	select per_org_ass_state as ORGANIZATION_S	The Query to be sent to EIQ Server	query	string
userInfo		User Information desired to be Audited	query	string
pageNumber	1	The page number to be retrieved from the returned result	query	string
pageSize	10	The number of items that exists on a single page. Default value is 1000 and maximum value is 100,000	query	string

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curl -X GET --header "Accept: application/json" --header "X-Auth-Token: YWRtaW5zZWNyZXRhZG1pbg" "http://localhost:8080/dataservice
```

Request URL

```
http://localhost:8080/dataservice/query?eiqAddress=localhost&port=1777&connectionString=schemaInterface%3DStandardDataModel&dataSo
```

Response Body

```
{
  "executionTime": "30.229799 ms",
  "startRow": "0",
  "hasNextPage": "true",
  "Results": [
    {
      "ORGANIZATION_STATE": "MA",
      "ORGANIZATION_CITY": "Arlington Heigh",
      "ORGANIZATION_NAME": "EcoleNatlSuperMines-Paris",
      "PERSON_ORG_ASSOCIATION": "8"
    },
    {
      "ORGANIZATION_STATE": "KF",
      "ORGANIZATION_CITY": "Santiago",
      "ORGANIZATION_NAME": "UnivNotreDame",
      "PERSON_ORG_ASSOCIATION": "7"
    },
    {
      "ORGANIZATION_STATE": "MA",
      "ORGANIZATION_CITY": "North Attleboro",
```

Swagger REST API demo screenshot (2 of 3)

Federated Query Example:

select "data source",

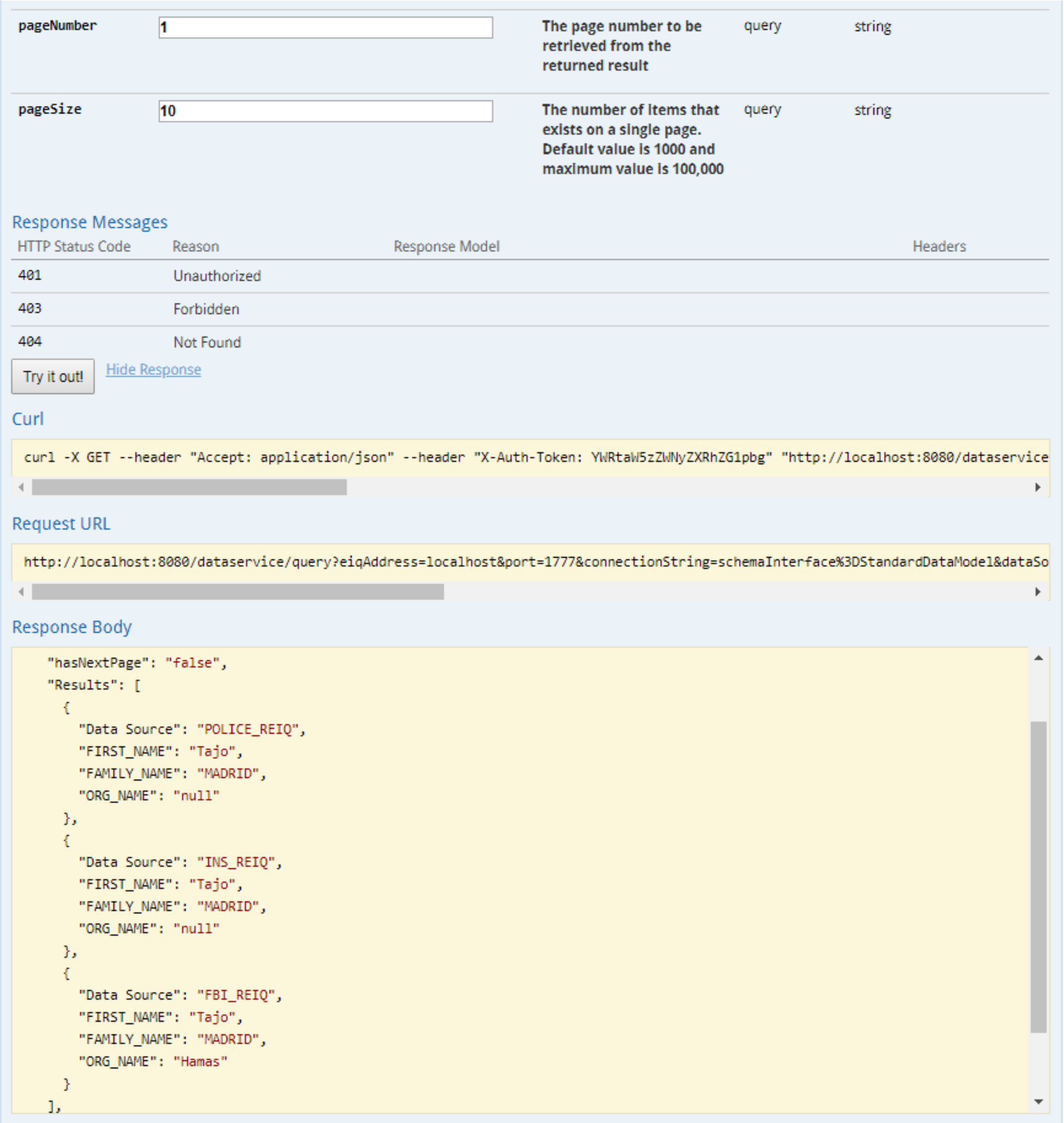
first_name,

family_name,

org_name

from mytable where mpi_mdm_id = '22453

Query returns results from multiple data sources as given in “Data Source” values.



pageNumber	1	The page number to be retrieved from the returned result	query	string
pageSize	10	The number of items that exists on a single page. Default value is 1000 and maximum value is 100,000	query	string

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Curl

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curl -X GET --header "Accept: application/json" --header "X-Auth-Token: YWRtaW5zZWNyZXRhZG1pbg" "http://localhost:8080/dataservice
```

Request URL

```
http://localhost:8080/dataservice/query?eiqAddress=localhost&port=1777&connectionString=schemaInterface%3DStandardDataModel&dataSo
```

Response Body

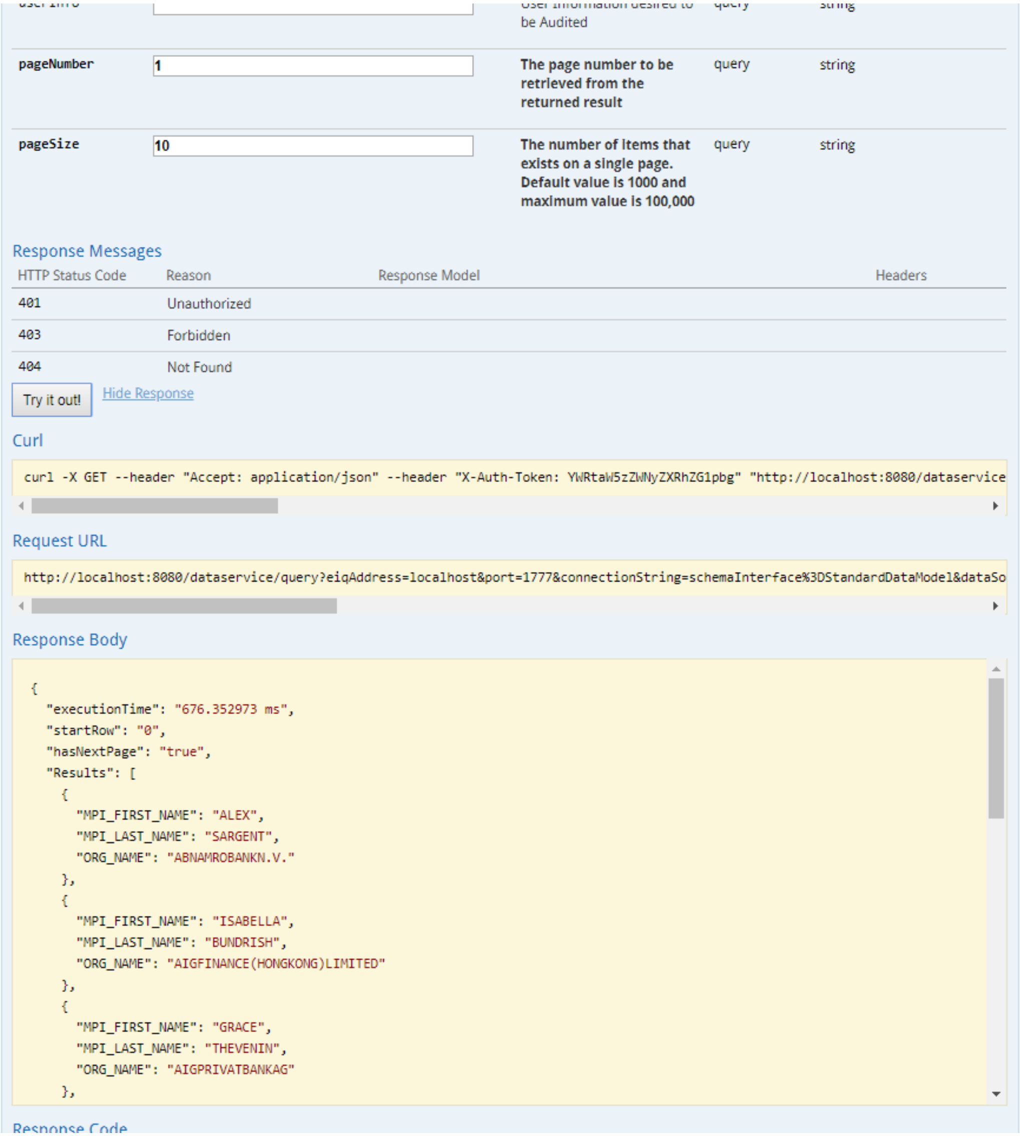
```
    "hasNextPage": "false",
    "Results": [
      {
        "Data Source": "POLICE_REIQ",
        "FIRST_NAME": "Tajo",
        "FAMILY_NAME": "MADRID",
        "ORG_NAME": "null"
      },
      {
        "Data Source": "INS_REIQ",
        "FIRST_NAME": "Tajo",
        "FAMILY_NAME": "MADRID",
        "ORG_NAME": "null"
      },
      {
        "Data Source": "FBI_REIQ",
        "FIRST_NAME": "Tajo",
        "FAMILY_NAME": "MADRID",
        "ORG_NAME": "Hamas"
      }
    ],
```

Swagger REST API demo screenshot (3 of 3)

Text Search Query Example:

Searching for people and organizations
that have police records containing root word “Bombing”

```
select mpi_first_name, mpi_last_name, org_name
from mytable
where mpi_mdm_id in
   (select mpi_mdm_id from mytable
    where
    contains('incident_note, stem(bombing)’)
   )
order by org_name;
```



userInfo		User information desired to be Audited	query	string
pageNumber	1	The page number to be retrieved from the returned result	query	string
pageSize	10	The number of items that exists on a single page. Default value is 1000 and maximum value is 100,000	query	string

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curl -X GET --header "Accept: application/json" --header "X-Auth-Token: YWRtaW5zZWNyZXRhZG1pbg" "http://localhost:8080/dataservice
```

Request URL

```
http://localhost:8080/dataservice/query?eiqAddress=localhost&port=1777&connectionString=schemaInterface%3DStandardDataModel&dataSo
```

Response Body

```
{
  "executionTime": "676.352973 ms",
  "startRow": "0",
  "hasNextPage": "true",
  "Results": [
    {
      "MPI_FIRST_NAME": "ALEX",
      "MPI_LAST_NAME": "SARGENT",
      "ORG_NAME": "ABNAMROBANKN.V."
    },
    {
      "MPI_FIRST_NAME": "ISABELLA",
      "MPI_LAST_NAME": "BUNDRISH",
      "ORG_NAME": "AIGFINANCE(HONGKONG)LIMITED"
    },
    {
      "MPI_FIRST_NAME": "GRACE",
      "MPI_LAST_NAME": "THEVENIN",
      "ORG_NAME": "AIGPRIVATBANKAG"
    },
```

Response Code

Hide/veil queries from data source systems

- Data source query very low-level – difficult to understand the application query
  - Application -> federation server/adapter-level -> data source-level DEMO
- Populated indexed views can also provide results without accessing data sources DEMO
- Highly sensitive queries can use index inversion – no data source access

Swagger REST API demo results (1 of 2)

1. Application query submitted to SDF EIQ Federation Server:

   select incident_type, incident_note, incident_street, incident_city, incident_state from mytable where INCIDENT_CITY= 'New York’ AND date_of_incidence between '1999-01-01' and '2000-01-01’ order by date_of_incidence desc

2. Same query submitted to each SDF EIQ SuperAdapter:

   SELECT ""dbo"".""INCIDENT"".""INCIDENT_TYPE"", ""dbo"".""INCIDENT"".""NOTE"", ""dbo"".""INCIDENT"".""LOCATION_STREET"", ""dbo"".""INCIDENT"".""LOCATION_CITY"", ""dbo"".""INCIDENT"".""LOCATION_STATE"" FROM ""dbo"".""INCIDENT"" WHERE ""dbo"".""INCIDENT"".""LOCATION_CITY"" = 'New York' AND ""dbo"".""INCIDENT"".""DATEOFINCIDENCE"" between '1999-01-01' and '2000-01-01' order by ""dbo"".""INCIDENT"".""DATEOFINCIDENCE"" desc

3. Same query submitted to each data source:

   i. SELECT""INCIDENT_ID"",""INCIDENT_TYPE"",""LOCATION_STREET"",""LOCATION_CITY"",""LOCATION_STATE"",""NOTE"" FROM ""dbo"".""INCIDENT"" WHERE ""INCIDENT_ID"" IN (?,?,?,?,?,?,?,?,?,?,?,?,?,?,?,?)

   ii. SELECT ""INCIDENT_ID"",""DATEOFINCIDENCE"" FROM ""dbo"".""INCIDENT"" WHERE ""INCIDENT_ID"" IN (?,?,?,?,?,?,?,?,?,?,?,?,?,?,?,?)

Swagger REST API demo results (2 of 2)

Pre-built index view definition:

```
select count(*) as freq, addr.add_state, addr.add_city as City,org.orgname as OrganizationName, count(org.orgname) as
PERSON_ORG_ASS from dbo.Address addr join dbo.person p on addr.per_id = p.per_id join dbo.organization_link orgl
on p.per_id = orgl.per_id join dbo.Organization org on orgl.orgid = org.orgid where add_city is not NULL and add_city <>''
group by add_state, add_city,orgname order by count(org.orgname) desc
```

1. Application query submitted to SDF EIQ Federation Server:

```
select per_org_ass_state as ORGANIZATION_STATE, per_org_ass_city as ORGANIZATION_CITY, per_org_name as
ORGANIZATION_NAME,  per_org_association_count as PERSON_ORG_ASSOCIATION from mytable where
per_org_ass_State = 'ny’
```

2. Same query submitted to each SDF EIQ SuperAdapter:

```
SELECT "DBO"."INDEXVIEW"."ADD_STATE", "DBO"."INDEXVIEW"."City", "DBO"."INDEXVIEW"."OrganizationName",
        "DBO"."INDEXVIEW"."PERSON_ORG_ASS" FROM "DBO"."INDEXVIEW" WHERE
"DBO"."INDEXVIEW"."ADD_STATE" = 'ny’
```

3. Same query submitted to each data source:

None

End of Swagger REST API demo