



# Tableau running against Hive-MapR through SmartData Fabric® on Azure Demo

November 2019



# Tableau running against Hive-MapR through SmartData Fabric® on Azure

## Customer Challenges

Hive-MapR is slow performing complex queries, similar to other Big Data systems. Standardized on Tableau and wants to run it on Hive-MapR on Azure in combination with on-prem data sources in a true, integrated VDW.

To avoid data copying and improve performance, wants to run Tableau in “Live Query” mode and not “Data Extract” mode, regardless of data source.

Wants AD/LDAP-based SSO with complete access and data security that Hive-MapR and other data sources cannot provide.

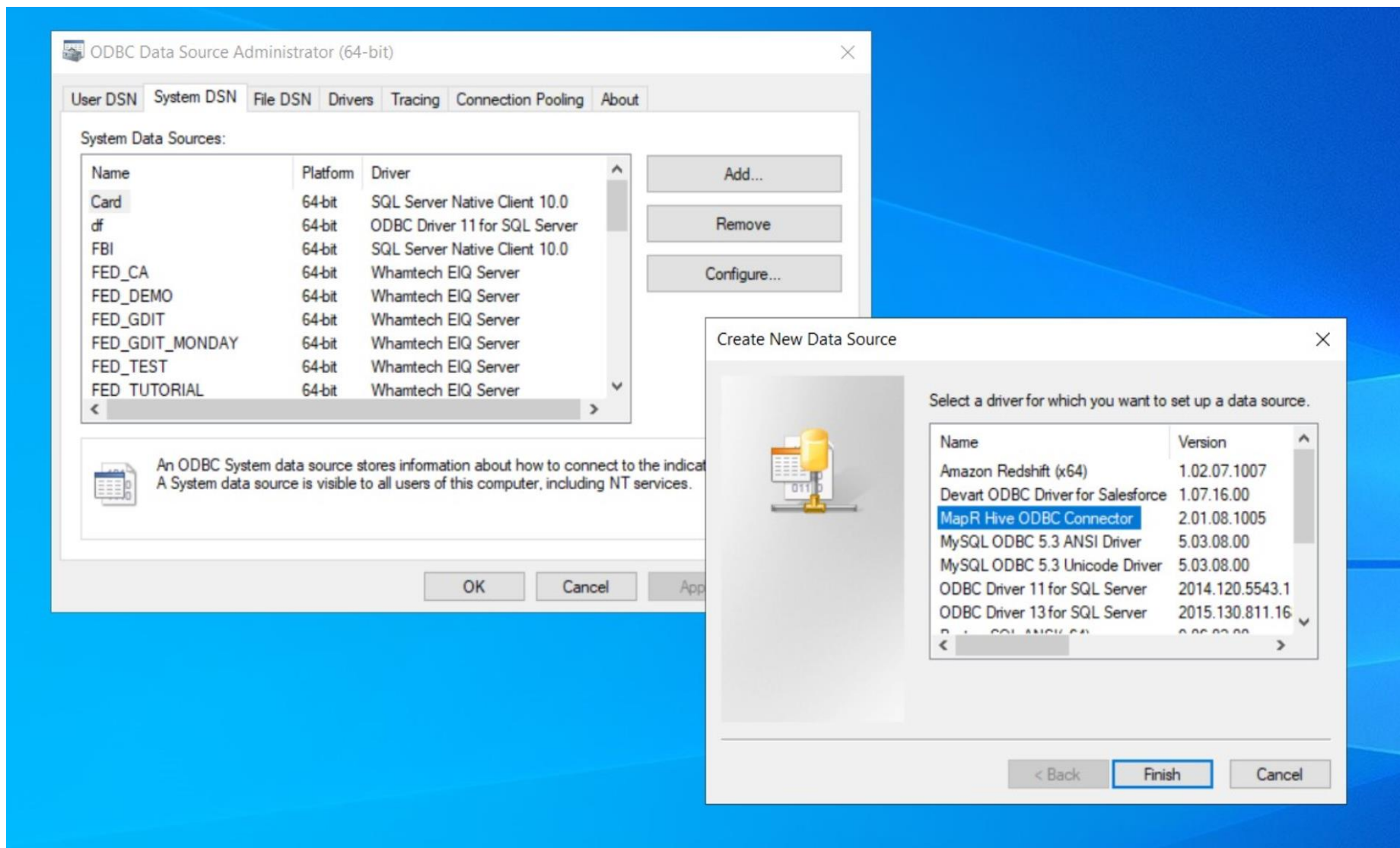
## SmartData Fabric® (SDF) Solution

Establish indexed adapters and federation servers for Hive-MapR using Hive ODBC driver, and for other data sources, running SDF in the Cloud (Hybrid Cloud 2.0) and/or on-prem (Hybrid Cloud 1.0). Read, Transform and Index (RTI) relevant data, map to Logical Data Views and run MDM.

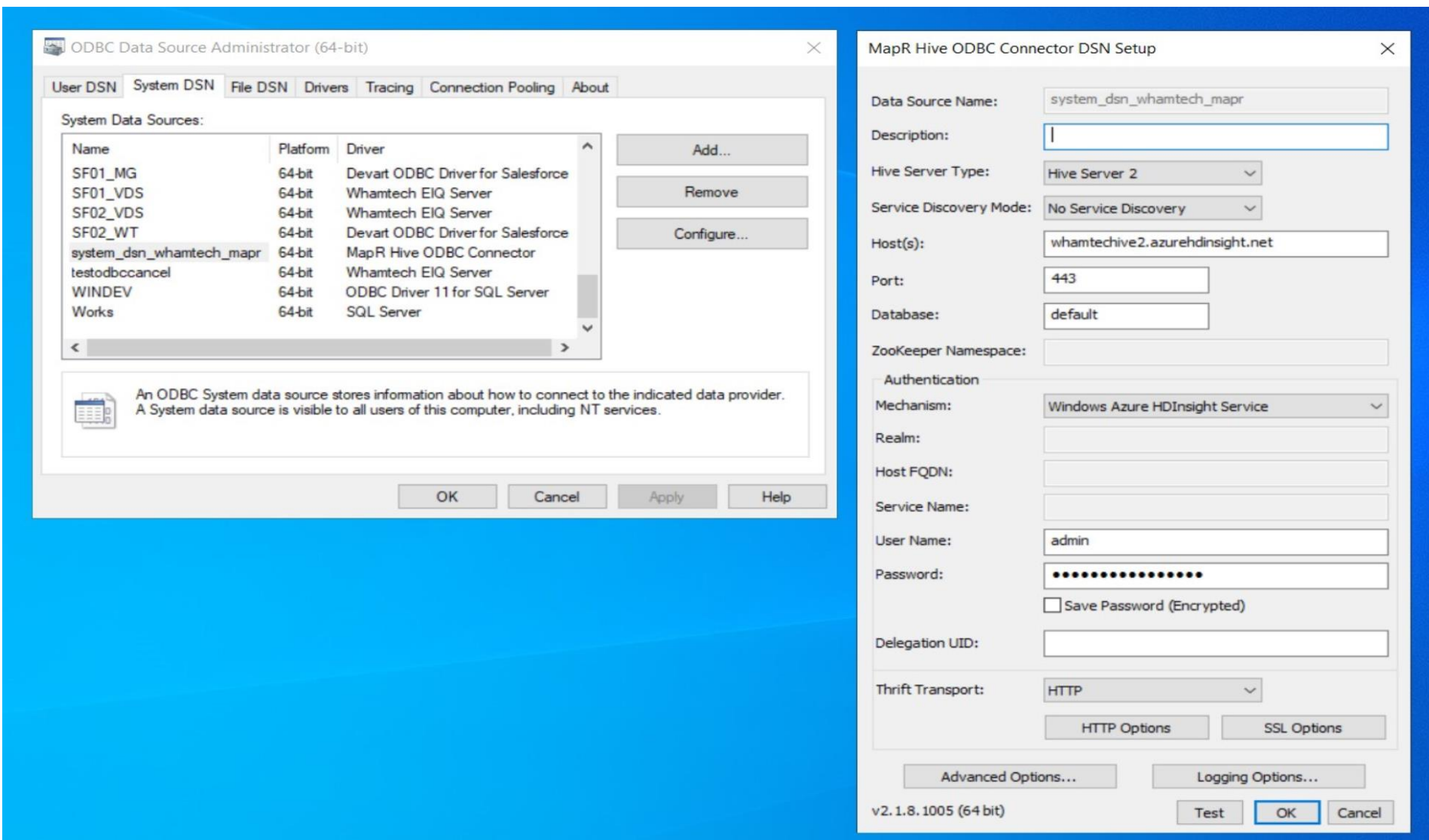
Run Tableau in both “Live Query” and “Data Extract” modes for comparison – allow the option of both.

Configure a number of different user and role (RBAC) profiles with various RLS, CLS and Data Source Level Security (DSLS).

# Install MapR ODBC driver



# Hive DSN connection



The image shows two windows from a Windows operating system. The left window is the 'ODBC Data Source Administrator (64-bit)' with the 'System DSN' tab selected. It displays a list of system data sources. The right window is the 'MapR Hive ODBC Connector DSN Setup' dialog box, which is used to configure a new DSN.

**ODBC Data Source Administrator (64-bit) - System Data Sources:**

Name	Platform	Driver
SF01_MG	64-bit	Devart ODBC Driver for Salesforce
SF01_VDS	64-bit	Whamtech EIQ Server
SF02_VDS	64-bit	Whamtech EIQ Server
SF02_WT	64-bit	Devart ODBC Driver for Salesforce
system_dsn_whamtech_mapr	64-bit	MapR Hive ODBC Connector
testodbcancel	64-bit	Whamtech EIQ Server
WINDEV	64-bit	ODBC Driver 11 for SQL Server
Works	64-bit	SQL Server

**MapR Hive ODBC Connector DSN Setup:**

Data Source Name: system\_dsn\_whamtech\_mapr

Description:

Hive Server Type: Hive Server 2

Service Discovery Mode: No Service Discovery

Host(s): whamtechive2.azurehdinsight.net

Port: 443

Database: default

ZooKeeper Namespace:

Authentication Mechanism: Windows Azure HDInsight Service

Realm:

Host FQDN:

Service Name:

User Name: admin

Password:

☐ Save Password (Encrypted)

Delegation UID:

Thrift Transport: HTTP

HTTP Options SSL Options

Advanced Options... Logging Options...

v2.1.8.1005 (64 bit) Test OK Cancel

# EQ Adapter index (aka EQ Index) initial build on Hive

CARD\_HIVEDB\_INDEX.rti - WhamTech EQ Server RTI Tool

File Edit View Tools Mode Help

Ready

Mode:RTI Indexing On Default:VK NUM

**Hive**

- card
  - account
    - accounttransaction
      - id( INT - 4 bytes )
      - customerid( INT - 4 bytes )
      - accountid( INT - 4 bytes )
      - transdate( TIMESTAMP - 24 bytes )
      - dateposted( DATE - 24 bytes )
      - merchantid( INT - 4 bytes )
      - amount( DECIMAL - 19 bytes )
      - status( STRING - 255 bytes )
      - isdisputed( TINYINT - 1 bytes )
      - method( STRING - 255 bytes )
      - direction( STRING - 255 bytes )
    - customers
    - merchant
  - default
  - information\_schema
  - sys

**CARD\_HIVEDB\_INDEX - (RTI MODE)**

- card.account
  - issuer(VARCHAR - 256 bytes)[VK]
  - cardnumber(VARCHAR - 256 bytes)[VK]
  - expirydate(DATETIME - 24 bytes)[VK]
  - limit(FLOAT - 8 bytes)[VK]
  - customerid(INT - 4 bytes)[VK]
  - accounttype(VARCHAR - 256 bytes)[VK]
  - id(INT - 4 bytes)[PK + 2 FKs]
  - availablebalance(NUMERIC - 22 bytes)[VK]
- card.accounttransaction
  - id(INT - 4 bytes)[VK]
  - customerid(INT - 4 bytes)[FK]
  - accountid(INT - 4 bytes)[FK]
  - transdate(DATETIME - 24 bytes)[VK]
  - dateposted( DATE - 24 bytes)[VK]
  - merchantid(INT - 4 bytes)[FK]
  - amount(NUMERIC - 22 bytes)[VK]
  - status(VARCHAR - 256 bytes)[VK]
  - isdisputed(CHAR - 4 bytes)[VK]
  - method(VARCHAR - 256 bytes)[VK]
  - direction(VARCHAR - 256 bytes)[VK]
- card.customers
  - firstname(VARCHAR - 256 bytes)[VK]
  - lastname(VARCHAR - 256 bytes)[VK]
  - dateofbirth(DATETIME - 24 bytes)[VK]
  - email(VARCHAR - 256 bytes)[VK]
  - gender(VARCHAR - 256 bytes)[VK]
  - socialsecuritynumber(VARCHAR - 256 bytes)[VK]
  - streetaddress(VARCHAR - 256 bytes)[VK]
  - city(VARCHAR - 256 bytes)[VK]
  - state(VARCHAR - 256 bytes)[VK]
  - zipcode(VARCHAR - 256 bytes)[VK]
  - phonenummer(VARCHAR - 256 bytes)[VK]
  - id(INT - 4 bytes)[PK+FK + 1 FKs]
  - longitude(REAL - 4 bytes)[VK]
  - latitude(REAL - 4 bytes)[VK]
  - lastmodifieddate(DATETIME - 24 bytes)[VK]
- card.merchant
  - id(INT - 4 bytes)[PK + 1 FKs]
  - merchant(VARCHAR - 256 bytes)[VK]

Data Source Properties

Name	Value
Server Name	Hive
DSN	system_dsn_whamtec...
UID	admin



# Registering Hive as a Data Source (DS)

WhamTech IEQ Server Management Console on <PLATINUM.corp.whamtech.com>(admin)

File Help

IEQ Server Virtual Data Sources | SuperSchema Mapping | Turboadapter Alias Mapping | Data Sources | Advanced Settings | Management

Name	Type	Driver	ID	Description
REIQ_EDW_ICIMS_R2	IEQ Server		0	
REIQ_EDW_ICIMS	IEQ Server		0	
REIQ_PROJECT_FINANCIAL	IEQ Server		0	
REIQ_BOTS	IEQ Server		0	
REIQ_WORKGROUP_CA	IEQ Server		0	
REIQ_ISRATIO	IEQ Server		0	
REIQ_WORKDAY	IEQ Server		0	
REIQ_ERES	IEQ Server		0	
REIQ_ETS	IEQ Server		0	
REIQ_WORKGROUP	IEQ Server		0	
REIQ_ETS_ISD_CA	IEQ Server		0	
POLICE_DSN	Database	ODBC		
FBI_DSN	Database	ODBC		
NORTHWIND_DSN	Database	ODBC		
FBI	Database	ODBC		
INS	Database	ODBC		
POLICE	Database	ODBC		
FBI_DEMO	Database	ODBC		
INS_DEMO	Database	ODBC		
POLICE_DEMO	Database	ODBC		
REIQ_POLICE_DEMO	IEQ Server			
REIQ_INS_DEMO	IEQ Server			
REIQ_FBI_DEMO	IEQ Server			
PM	Database	ODBC		
WORKS	Database	ODBC		
REIQ_WORKS	IEQ Server			
REIQ_PM	IEQ Server			
HIVEDB_DS	Database	ODBC		

Buttons: Add Data Source, Add Remote Server Data Source, Edit, Delete

Data Source Registration

Alias:

ID:

Data Source Type:

Data Source Name:

Connection String:

User Name:

Password:

Schema Name:

Buttons: OK, Cancel, Test Connection, Show Description

IEQ Server Configuration Tool

Connection tested successfully.

Button: OK

Help

# Pairing Hive DS with Hive EIQ Index as Hive Virtual DS (VDS)

WhamTech EIQ Server Management Console on <PLATINUM.corp.whamtech.com>(admin)

File Help

EQ Server Virtual Data Sources | SuperSchema Mapping | Turboadapter Alias Mapping | Data Sources | Advanced Settings | Management

Refresh Edit Metadata Dictionary

List of Virtual Data Sources

Name	# of Data Sources	Description
CARD_HIVEDB_VDS	1	
FBI_DEMO_VDS	1	
FBI_VDS	1	
FED_DEMO	3	
FED_GDIT	10	
FED_ICIMS	1	
FED_NUMERIC_ISSUE	2	
FED_VMPI	2	
INS_DEMO_VDS	1	
NORTHWIND_VDS	1	
PM_VDS	1	
POL_VDS_NOTE	1	
POLICE_DEMO_VDS	1	
POLICE_VDS	1	
WORKS_VDS	1	

EIQ Server Virtual Data Source

Name: CARD\_HIVEDB\_VDS

SuperSchema Tables

Table Name	Number of Columns
MyTable	289

Data Source - EIQ Index Pairs

EIQ Server Index	Data Source	ID	Main Data
C:\Program Files\WhamTech\Data\Tutorial\CARD_HIVEDB_INDEX\...	HIVEDB_DS	0	

Data Source - EIQ Index Pair

☐ Passthrough: Do not use an EIQ Server Index. Pass commands directly to the data source.

Data Source (must be registered): HIVEDB\_DS

EIQ Server Index: C:\Program Files\WhamTech\Data\Tutorial\CARD\_HIVEDB\_INDEX\CARD\_HI Browse

Advanced Options >>

Define New Edit Delete Generate Scripts... New Script...

Help

# Hive EIQ Index mapping to SuperSchema/Logical Data View

WhamTech EIQ Server Management Console on <PLATINUM.corp.whamtech.com>(admin)

File Help

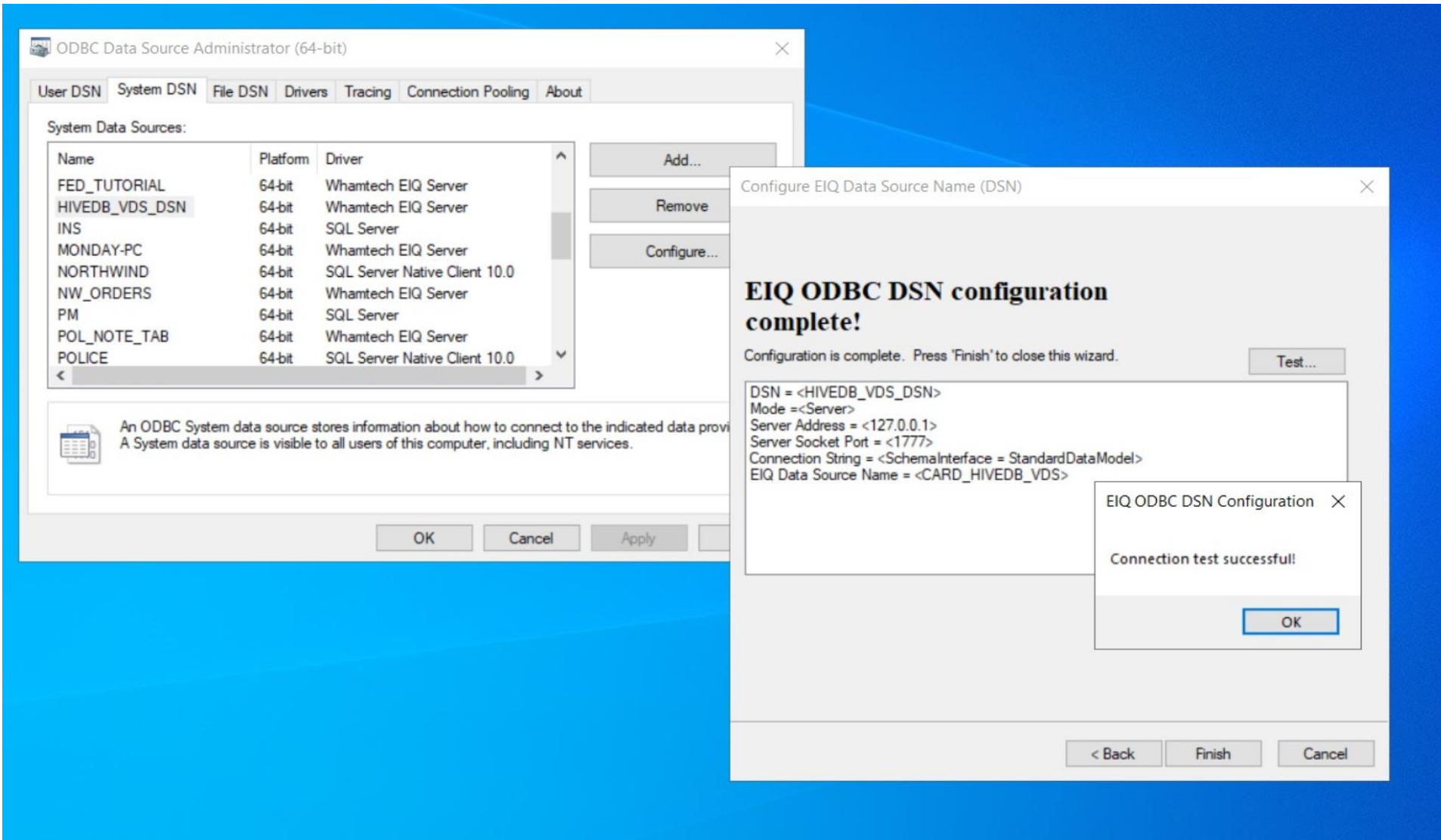
☐ Show all tables from all schemas
 ☐ Show indexed schemas
 ☒ Show indexed tables
 ☐ Show entity mapping

Schema Na...	Table Name	Column Name	Native ...	EIQ Data Type	Metadata Column	Attribute
PLATINUM.corp.wh...	card	accounttype	STRING	VARCHAR(255)	Account Type	
FED_NUMERIC	card	account	DECIMAL	NUMERIC(15,4)	AvailableBalance	
FED_ICIMS	card	account	STRING	VARCHAR(255)	CardNumber	
FED_GDIT	card	account	INT	INT	CID	
POLICE_VDS	card	account	TIMESTAM...	TIMESTAMP	ExpiryDate	
FBI_VDS	card	account	INT	INT	AID	PK   RID_PRIMARY   2 ...
NORTHWIND_...	card	account	STRING	VARCHAR(255)	Issuer	
POL_VDS_NOT	card	account	DOUBLE	FLOAT	Limit	
INS_DEMO_VD	card	accounttrans...	INT	INT	AccountID	FK   RID_SECONDARY
POLICE_DEMO	card	accounttrans...	DECIMAL	NUMERIC(15,4)	Amount	
FBI_DEMO_VD	card	accounttrans...	INT	INT	CusID	FK   RID_PRIMARY
FED_DEMO	card	accounttrans...	DATE	DATE	DatePosted	
PM_VDS	card	accounttrans...	STRING	VARCHAR(255)	Direction	
WORKS_VDS	card	accounttrans...	INT	INT	ATID	
FED_VMPI	card	accounttrans...	TINYINT	CHAR(3)	IsDisputed	
CARD_HIVEDB	card	accounttrans...	INT	INT	MID	FK   RID_EXTRA
Programmat...	card	accounttrans...	STRING	VARCHAR(255)	Method	
Materialized	card	accounttrans...	STRING	VARCHAR(255)	Status	
HIVEDB_D...	card	accounttrans...	STRING	VARCHAR(255)	TransDate	
	card	customers	TIMESTA...	TIMESTAMP	CITY	
	card	customers	STRING	VARCHAR(255)	DOB	
	card	customers	TIMESTA...	TIMESTAMP	Email	
	card	customers	STRING	VARCHAR(255)	First Name	
	card	customers	STRING	VARCHAR(255)	Gender	
	card	customers	INT	INT	ID	PK   FK   RID_PRIMARY...
	card	customers	INT	INT		
	card	customers	TIMESTA...	TIMESTAMP		
	card	customers	STRING	VARCHAR(255)	LastName	
	card	customers	REAL	REAL	Latitude	
	card	customers	REAL	REAL	Longitude	
	card	customers	STRING	VARCHAR(255)	PHONENUMBER	
	card	customers	STRING	VARCHAR(255)	SSN	
	card	customers	STRING	VARCHAR(255)	STATE	
	card	customers	STRING	VARCHAR(255)	StreetAddress	
	card	customers	STRING	VARCHAR(255)	ZIPCODE	
	card	merchant	STRING	VARCHAR(255)	Category	
	card	merchant	STRING	VARCHAR(255)	MCity	
	card	merchant	INT	INT	MerID	PK   RID_PRIMARY   1 ...
	card	merchant	INT	INT		
	card	merchant	REAL	REAL	Latitude	
	card	merchant	REAL	REAL	Longitude	
	card	merchant	STRING	VARCHAR(255)	Merchant	
	card	merchant	STRING	VARCHAR(255)	MPhoneNumber	
	card	merchant	STRING	VARCHAR(255)	MState	
	card	merchant	STRING	VARCHAR(255)	MStreet	
	card	merchant	STRING	VARCHAR(255)	STREET2	
	card	merchant	STRING	VARCHAR(255)	M7...	

[Build Link Index](#)
[Edit Entity Data](#)
[Edit Metadata Dictionary](#)
[Topology](#)
[Edit](#)
[Save Now](#)
[Help](#)



# Configuring and testing EIQ Adapter to Hive ODBC as HIVEDB\_VDS\_DSN



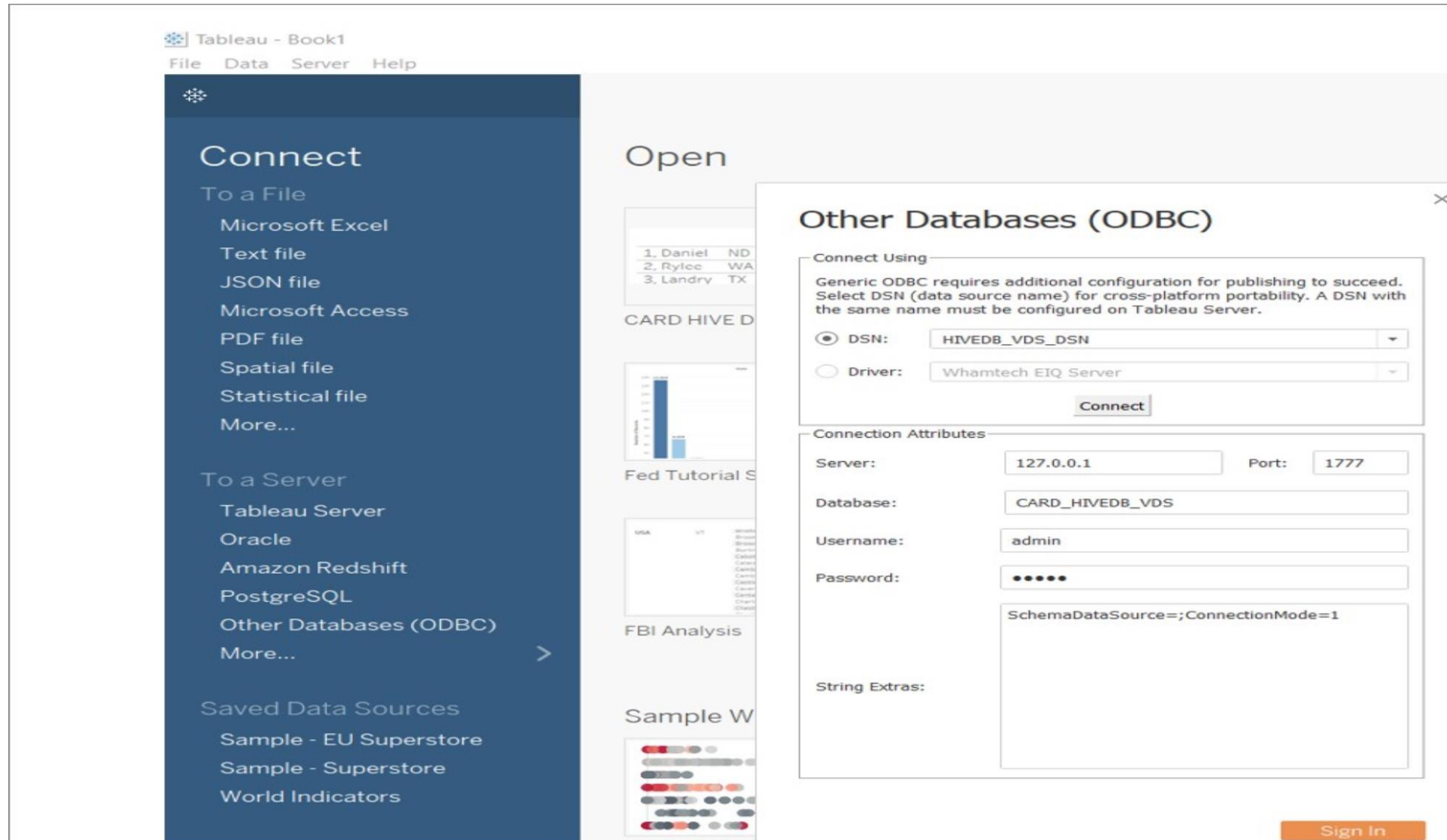
The screenshot displays the ODBC Data Source Administrator (64-bit) window with the 'System DSN' tab selected. The 'System Data Sources' list includes several entries, with 'HIVEDB\_VDS\_DSN' highlighted. To the right of the list are buttons for 'Add...', 'Remove', and 'Configure...'. Below the list, a message states: 'An ODBC System data source stores information about how to connect to the indicated data provider. A System data source is visible to all users of this computer, including NT services.'

Overlaid on the main window is the 'Configure EIQ Data Source Name (DSN)' wizard. The wizard's title bar reads 'Configure EIQ Data Source Name (DSN)'. The main content area displays the following configuration details:

- EIQ ODBC DSN configuration complete!**
- Configuration is complete. Press 'Finish' to close this wizard.
- DSN = <HIVEDB\_VDS\_DSN>
- Mode = <Server>
- Server Address = <127.0.0.1>
- Server Socket Port = <1777>
- Connection String = <SchemaInterface = StandardDataModel>
- EIQ Data Source Name = <CARD\_HIVEDB\_VDS>

A 'Test...' button is located to the right of the configuration details. Below the details, a smaller dialog box titled 'EIQ ODBC DSN Configuration' displays the message 'Connection test successful!' and an 'OK' button. At the bottom of the wizard, there are '< Back', 'Finish', and 'Cancel' buttons.

# Configuring Tableau to EIQ Adapter through HIVEDB\_VDS\_DSN



The screenshot shows the Tableau desktop application interface. On the left, the 'Connect' menu is open, displaying options for connecting to various data sources. The 'Other Databases (ODBC)' option is highlighted. On the right, the 'Other Databases (ODBC)' dialog box is open, showing the configuration for connecting to a database using a DSN.

**Connect**

- To a File
  - Microsoft Excel
  - Text file
  - JSON file
  - Microsoft Access
  - PDF file
  - Spatial file
  - Statistical file
  - More...
- To a Server
  - Tableau Server
  - Oracle
  - Amazon Redshift
  - PostgreSQL
  - Other Databases (ODBC)
  - More...
- Saved Data Sources
  - Sample - EU Superstore
  - Sample - Superstore
  - World Indicators

**Open**

- CARD HIVE D
- Fed Tutorial S
- FBI Analysis
- Sample W

**Other Databases (ODBC)**

Connect Using

Generic ODBC requires additional configuration for publishing to succeed. Select DSN (data source name) for cross-platform portability. A DSN with the same name must be configured on Tableau Server.

☒ DSN: **HIVEDB\_VDS\_DSN**

☐ Driver: **Whamtech EIQ Server**

**Connect**

Connection Attributes

Server: **127.0.0.1** Port: **1777**

Database: **CARD\_HIVEDB\_VDS**

Username: **admin**

Password: **\*\*\*\*\***

SchemaDataSource=;ConnectionMode=1

String Extras:

**Sign In**



# Tableau using Live Connection to Hive VDS

Tableau - CREDIT CARD HIVE DB REPORTS

FileDataServerWindowHelp

127.0.0.1

Other Databases (ODBC)

Database

CARD\_HIVEDB\_VDS

Schema

SUPERSHEMA

Table

Enter table name

Exact

Contains

Starts with

MyTable (SU...MA.MyTable)

New Custom SQL

MyTable (SUPERSHEMA.MyTable) (CARD\_HIVEDB\_VDS)

Connection

Live

Extract

Filters

0

Add

MyTable

Sort fields

Data source order

Show aliases

Show hidden fields

rows

Abc MyTable Data Source	City	DOB	SSN	State	Street2	Phonenumber	Zipcode	Account Type	Available Balance	Card Number	CID	Expiry Date	AID	Issuer
-------------------------------	------	-----	-----	-------	---------	-------------	---------	--------------	-------------------	-------------	-----	-------------	-----	--------

Update Now

Automatically Update

Data Source

Summary

State Wise Amount Limits

Map View

Line Graph

Pivot View

Disputed Amount

Other Views

State Wise Summary

Disputed Amount Analysis

Views



# Results of Live Query on Hive VDS EIQ Indexes and subsequent results read from Hive

Tableau - CREDIT CARD HIVE DB REPORTS

FileDataServerWindowHelp

Connections

127.0.0.1  
Other Databases (ODBC)

Add

Database

CARD\_HIVEDB\_VDS

Schema

SUPERSHEMA

Table

Enter table name

ExactContainsStarts with

MyTable (SU...MA.MyTable)

New Custom SQL

MyTable (SUPERSHEMA.MyTable) (CARD\_HIVED...

Connection  
LiveExtract

Filters  
0Add

Sort fieldsData source order

Show aliasesShow hidden fields1,000rows

MyTable City	MyTable SSN	MyTable State	MyTable Phonenumber	MyTable Account Type	MyTable Card Number	MyTable CID	MyTable Issuer	MyTable Limit	MyTable Account ID	MyTable Amount	MyTable Is Disputed	MyTable Trans Date	MyTable Email	MyTable First Nan
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	350.00	0	7/11/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	-2.30	0	5/21/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	77.94	0	9/6/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	77.94	0	9/6/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	359.00	0	6/29/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	540.00	0	10/3/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	1	184.00	0	8/1/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Fargo	223.88.542	ND	912)523.4682	credit	6395-9271-7924-5240	1	instapayment	2,642.00	510	14.99	0	9/10/2013 12:00:00 AM	Landen.CAMPOS5043...	Daniel
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	350.00	0	8/13/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	53.24	0	9/6/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	53.24	0	9/6/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	15,120.00	0	5/16/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	175.00	0	10/3/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	175.00	0	10/3/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee
Kent	179)55)830	WA	205)802)0615	credit	6498-9252-9248-3306	2	discover	8,843.00	2	184.00	0	8/1/2013 12:00:00 AM	Ryle.HICKM6247@gm...	Rylee

Data Source

SummaryState Wise Amount LimitsMap ViewLine GraphPivot ViewDisputed AmountOther ViewsState Wise SummaryDisputed Amount AnalysisViews

# Tableau using Extract Connection to Hive VDS

Connections Add

127.0.0.1  
Other Databases (ODBC)

Database  
CARD\_HIVEDB\_VDS

Schema  
SUPERSHEMA

Table  
Enter table name +  
☒ Exact ☐ Contains ☐ Starts with  
MyTable (SU...MA.MyTable)  
New Custom SQL

MyTable

Extract will include all data.

Sort fields Data source order

☐ Show aliases ☐ Show hidden fields rows

Abc MyTable Data Source	MyTable City	Abc MyTable SSN	MyTable State	Abc MyTable Phonenumber	Abc MyTable Account Type	Abc MyTable Card Number	# MyTable CID	Abc MyTable Issuer	# MyTable Limit	# MyTable Account ID	# MyTable Amount	Abc MyTable Is Disputed	MyTable Trans Date	Abc MyTable Email	A N F
-------------------------------	-----------------	-----------------------	------------------	-------------------------------	--------------------------------	-------------------------------	---------------------	--------------------------	-----------------------	----------------------------	------------------------	-------------------------------	-----------------------	-------------------------	-------------

Update Now

Automatically Update

Data Source

Summary

State Wise Amount Limits

Map View

Line Graph

Pivot View

Disputed Amount

Other Views

State Wise Summary

Disputed Amount Analysis

Views





# Results of Extract Query on Hive VDS EIQ Indexes and subsequent results read from Hive

Tableau - CREDIT CARD HIVE DB REPORTS

File Data Server Window Help

Connections Add

127.0.0.1  
Other Databases (ODBC)

Database  
CARD\_HIVEDB\_VDS

Schema  
Select Schema

Table  
Enter table name +

☒ Exact ☐ Contains ☐ Starts with

New Custom SQL

MyTable (SUPERSHEMA.MyTable) (CARD\_HIVED...

Connection  
☐ Live ☒ Extract Edit Refresh 0 Add  
Extract will include all data.

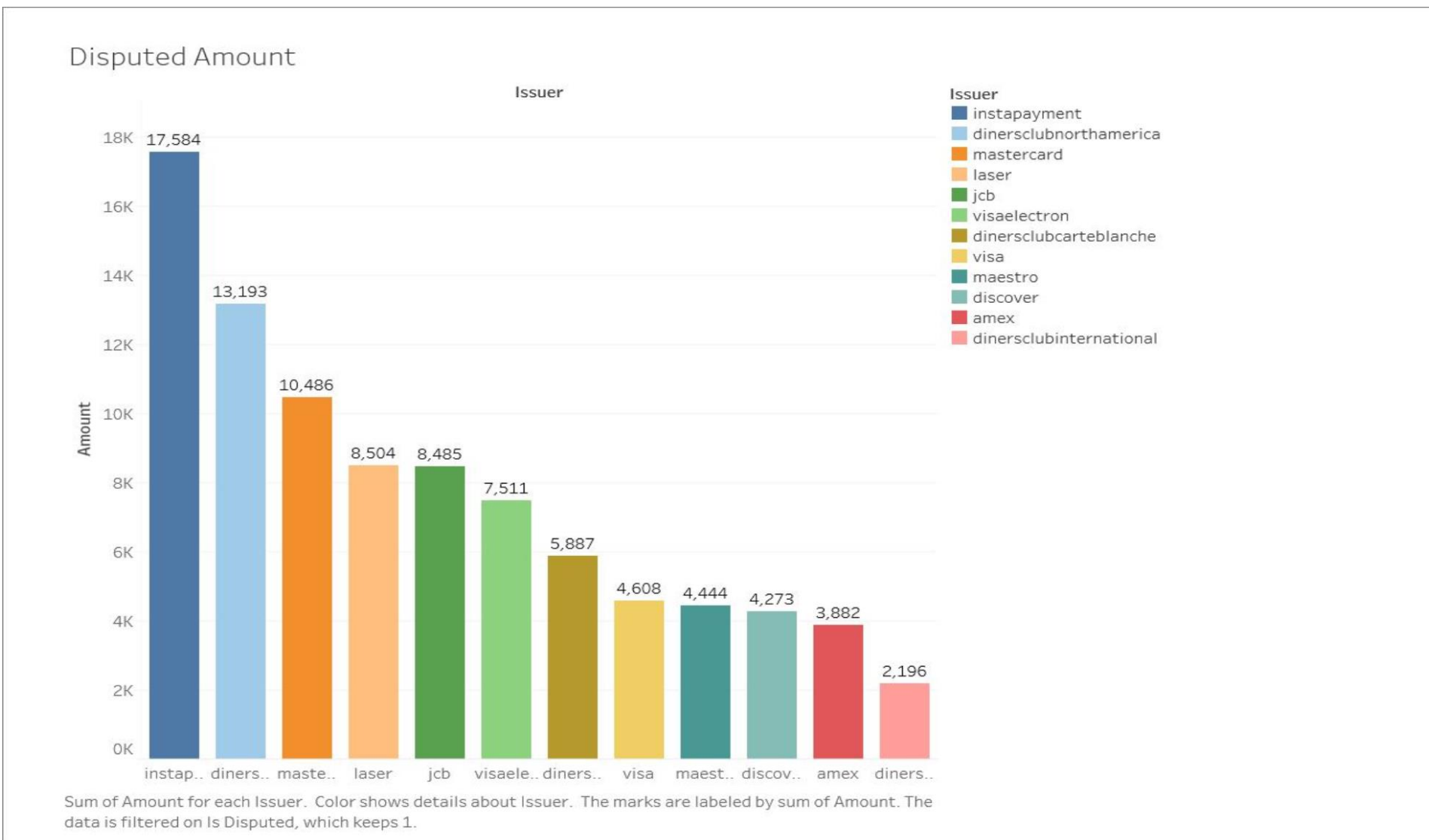
Filters

Sort fields Data source order Show aliases Show hidden fields 1,000 rows

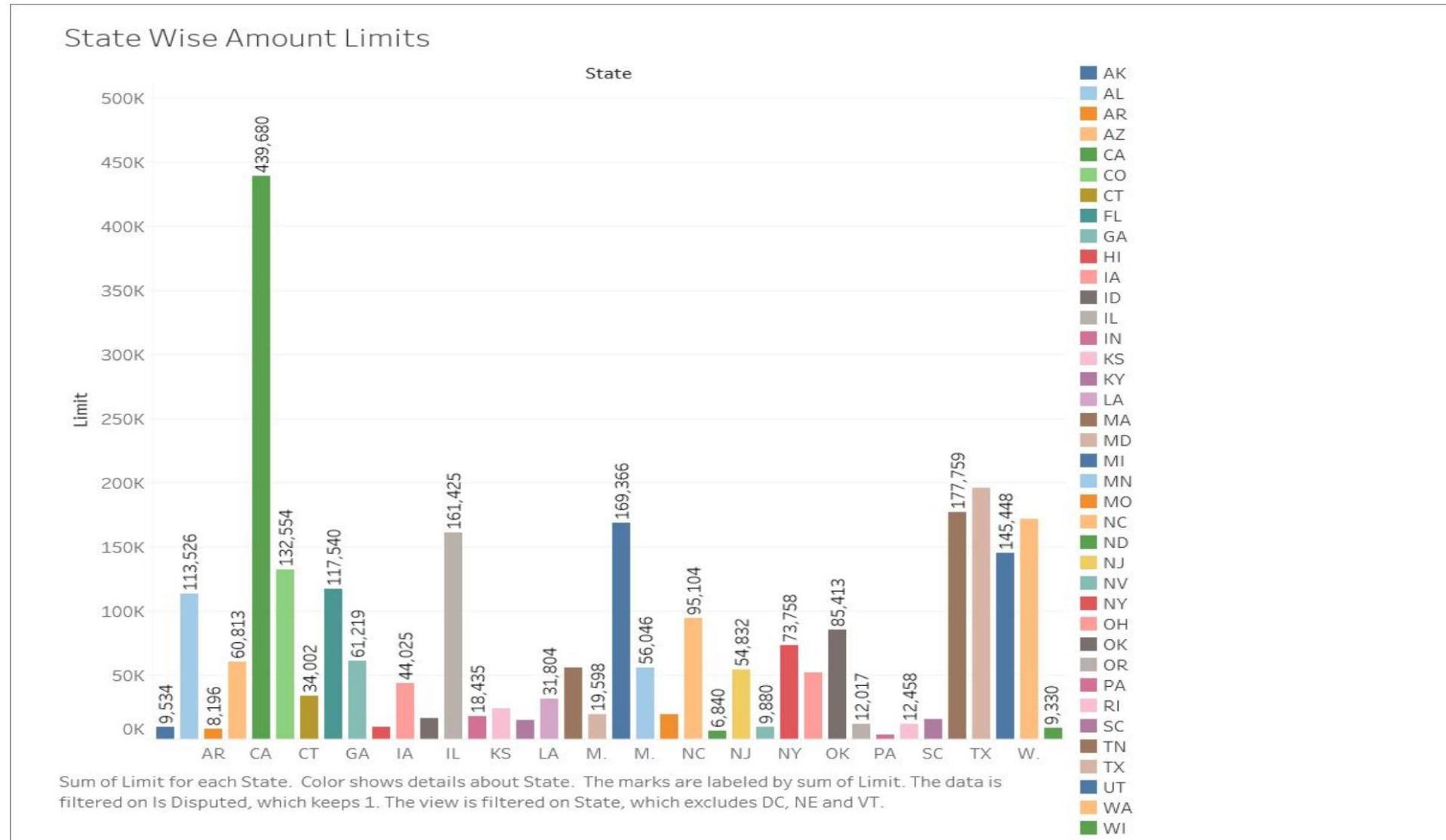
MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable	MyTable
Data Source	City	DOB	SSN	State	Street2	Phonenumber	Zipcode	Account Type	Available Bala...	Card Number	CID	Expiry
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Fargo	5/29/2003 12:00...	223.88.542	ND	NULL	912)523.4682	58056	credit	null	6395-9271-7924...	1	2/1
HIVEDB_DS	Kent	7/7/2006 12:00:...	179)55)830	WA	NULL	205)802)0615	98089	credit	null	6498-9252-9248...	2	4/1
HIVEDB_DS	Kent	7/7/2006 12:00:...	179)55)830	WA	NULL	205)802)0615	98089	credit	null	6498-9252-9248...	2	4/1
HIVEDB_DS	Kent	7/7/2006 12:00:...	179)55)830	WA	NULL	205)802)0615	98089	credit	null	6498-9252-9248...	2	4/1

Data Source Summary State Wise Amount Limits Map View Line Graph Pivot View Disputed Amount Other Views State Wise Summary Disputed Amount Analysis Views

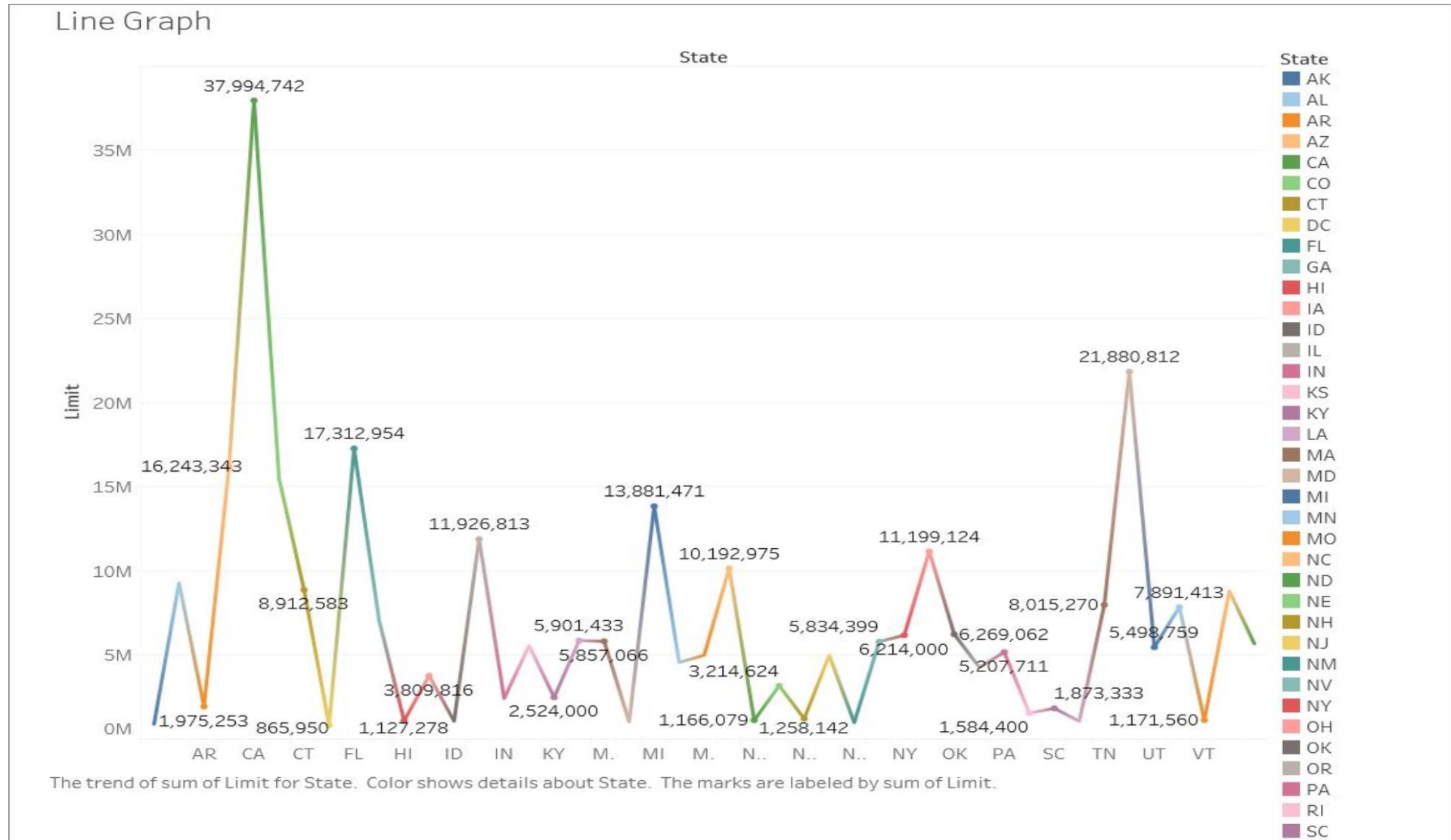
# Tableau report: Disputed Amount



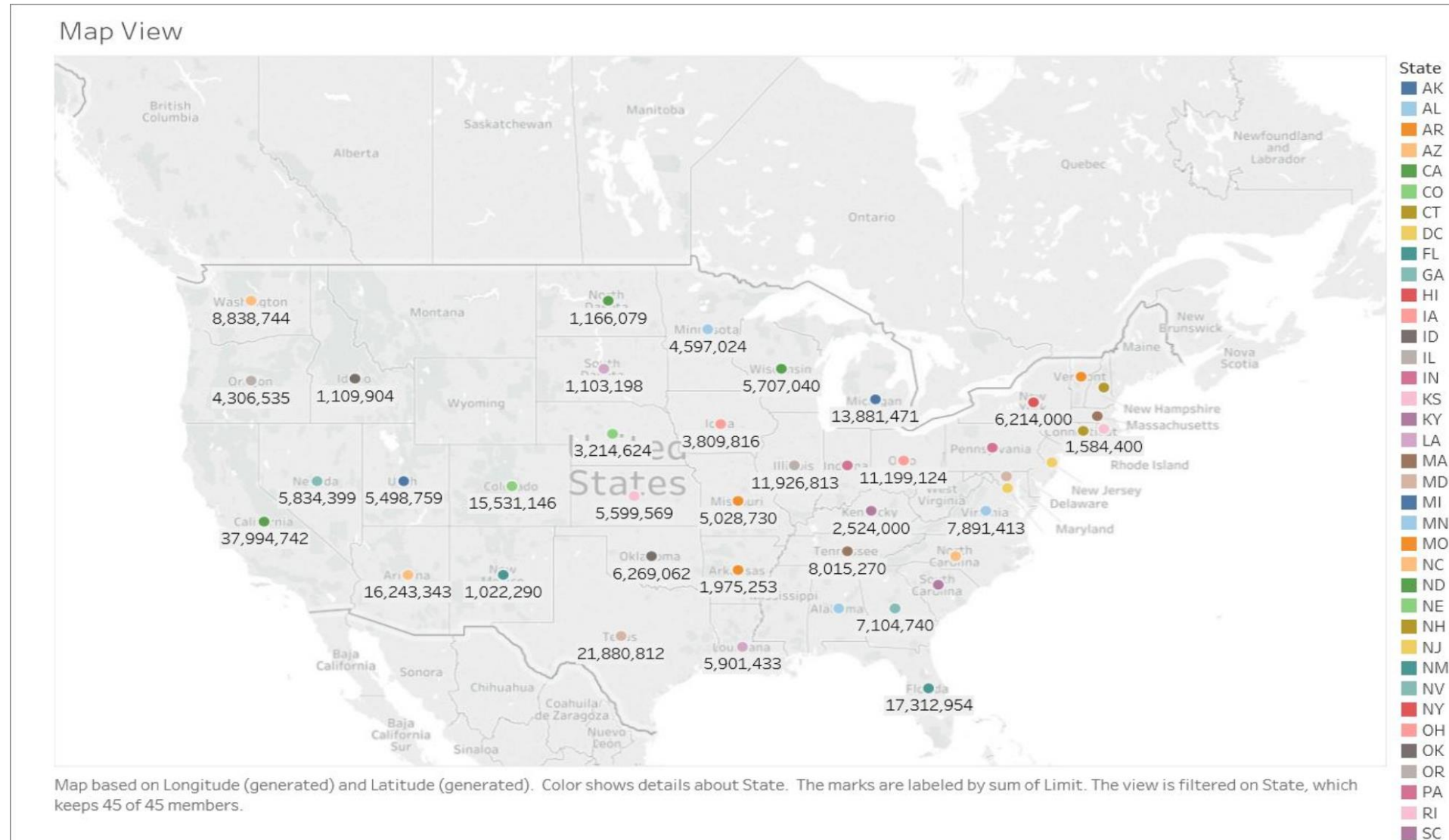
# Tableau report: State Wise Amounts Limits



# Tableau report: Line graph

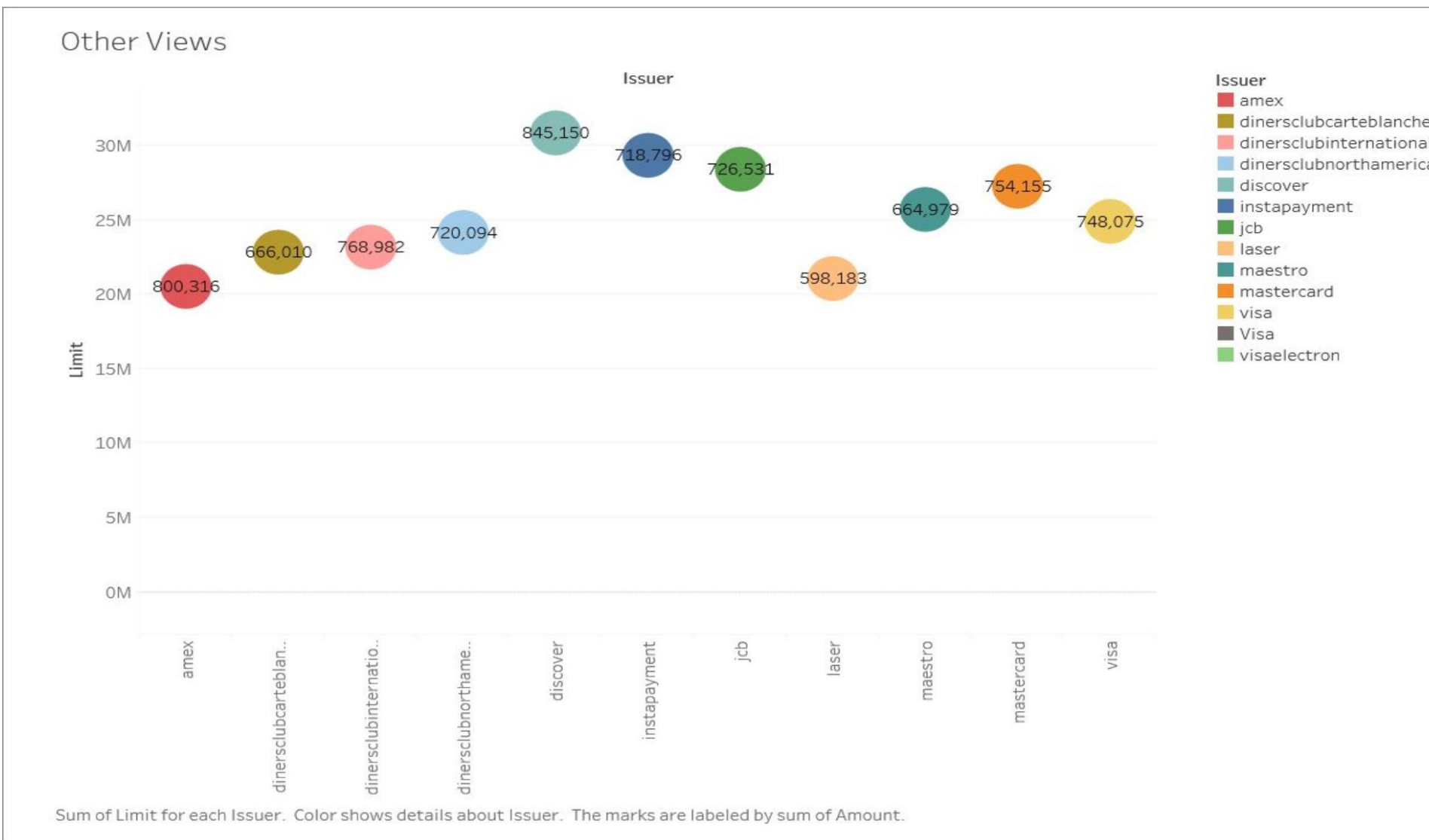


# Tableau report: Map view





# Tableau report: Other views



# Tableau report: Pivot view

Pivot View

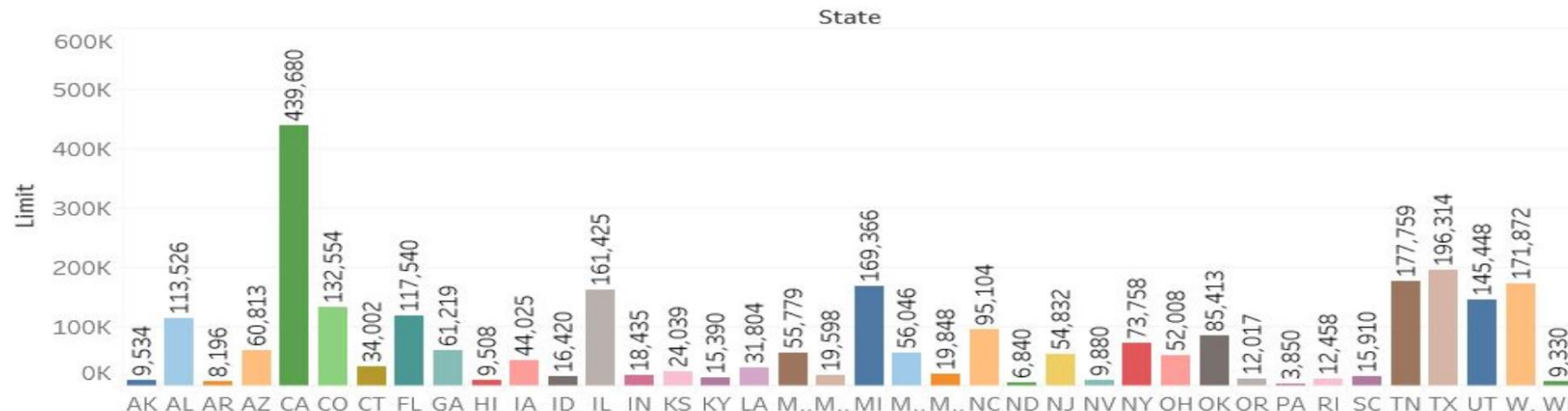
Merchant	AK	AL	AR	AZ	CA	CO	CT	FL	GA	HI	IA	ID	IL	IN	KS	KY	LA	MA	MD	MI	MN	MO	NC	ND	NJ	NV	NY	OH	OK	OR	PA	RJ	SC	TN	State	
OKLAHOMA CONTRACTORS..				9,620																															AK	
BURK OIL CO INC																				2,236			3,766												AL	
RDC ROCHE DIAGNOSTICS																																			AR	
WESTERN PRINTING CO.								3,290																											AZ	
EEL				3,220																															CA	
IRRIGATION STATION #2																											3,163								CO	
TURNING TECHNOLOGIES					130																							2,879							CT	
ARTISIGNINC																												2,738							GA	
CHIPOTLE 1161					2,378																														FL	
BIO RAD				2,363																															GA	
TACONY / POWR FLITE / TOR					1,984																														HI	
COWBOY COPY													1,606																						IA	
PEPROTECH					633											838																		ID		
*WOODCREST LITHO																												1,509							IN	
MCMMASTER-CARR	182																					1,297													KS	
SIGNS NOW # 229																	1,429																		KY	
DUPREES SPORTS EQUIPM..																																			LA	
WSU FULLMAN																																				MA
*GRIMSLEY'S																																				MD
B & H PHOTO-VIDEO.COM																																				MI
XPEOX-INTL PAPER								1,260																											MN	
STAPLESPROMOTIONALPR..																						1,160													MO	
LESLIES POOL SPLV 3023																																				NC
INVITROGEN 23575467						1,003																													ND	
VWV GRANGER		417		45															431										24						NJ	
AMWAY GRAND PLAZA HO..																													886							NV
CADDO ELECTRIC COOPERA..																																				NY
AD ASTRA INFORMATION S..																																				OH
SOCIAL SCIENCE ELECTRON..																																				OK
ALFA AESAR																																				OR
NAPA AUTO PARTS																																				PA
PAY STORAGE STATION																																				RI
DEARINGER PRINTING & TR..																																				SC
*ISIS COMPUTER SUPPLY																																				TN
TKO ELECTRONICS INC.																																				TX
TENNIS WAREHOUSE																																				UT
PAYPAL EBAYGENESIS																																				WA
CYGNUS BUSINESS MEDIA																																				WI
KENZE PANNE																																				
*AMS																																				
GE HEALTHCARE BIO-SCIE..																																				
WAL-MART #0137																																				
AB MEDICAL TECHNOLOGIE..																																				
REXEL2442																																				
SHERATON NASHVILLE																																				
INVITROGEN 23299284																																				
SWVS																																				
STILLWATER SCREENPRINT..																																				
PAYPAL BIDCANCMMU																																				
FIRST IMPRESSIONS PARK..																																				
OU CCE REG WEB																																				
VWR INTERNATIONAL INC																																				
SAMMIES																																				
THE LIBRARY STORE																																				
ACCUTEX LABORATORIES																																				
REI MATTHEW BENDER & CO																																				
AMERICAN AI 0017291145..																																				
THELEARNINGPIT																																				
NATEF																																				
FOUR FLAGS OVER ASP																																				
HELT PHOTOGRAPHY																																				
4WHEEL ONLINE																																				
EES																																				
TED PELLA INC																																				
HAMPTON INN EDMOND																																				
REDDY ICE																					</															

# Tableau report: State wise amount limits dashboard

## Summary

State	First Na..	SSN	Merchant	Account I..	Is Disput..	Amount	Limit
CA	Janiya	165*74*304	OKLA. PRESS SERVI..	884	1	147	18,403
	Janiyah	465.02.990	TURNING TECHNOL..	151	1	130	18,304
	Marianna	672.96.724	NAPA AUTO PARTS	132	1	44	4,953
	Marina	668/94/367	POCKET NURSE ENT..	82	1	261	14,476
	Mikayla	557-92-255	OFFICE DEPOT #1079	998	1	2	1,392
	Rayan	116!71!677	REXEL2442	568	1	191	4,032
	Rihanna	582@72@878	ATW OF STILLWATE..	198	1	240	82,770
	Saniya	318#04#976	TACONY / POWR FLI..	456	1	1,984	18,606
			TEN ONE DESIGN LLC	456	1	92	9,303
	Sidney	364-52-316	CHIPOTLE 1161	328	1	2,378	9,592
	Ty	426-17-148	UPS 0906927939	205	1	16	11,151
	Valentin	332-34-208	AMERICAN AI 00172..	267	1	410	1,788
	Zaria	181-74-836	INTEGRATED DNA T..	733	1	22	12,642
CO	Abdullah	554/30/622	INVITROGEN 23575..	731	1	1,003	13,550
	Adeline	475&96&454	REDDY ICE	365	1	312	13,021

## State Wise Amount Limits

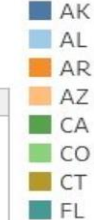


# Tableau report: Disputed amount dashboard

Pivot View

Merchant	AK	AL	AR	AZ	CA	CO	CT	FL	GA	HI
OKLAHOMA CONTRACTORS..					9,620					
BURK OIL CO INC										
RDC ROCHE DIAGNOSTICS										
WESTERN PRINTING CO.								3,290		
EEI					3,220					
IRRIGATION STATION #2										
TURNING TECHNOLOGIES					130					
ARTISIGNINC										
CHIPOTLE 1161					2,378					
BIO RAD				2,353						
TACONY / POWR FLITE / TOR					1,984					
COWBOY COPY										
PEPROTECH					633					

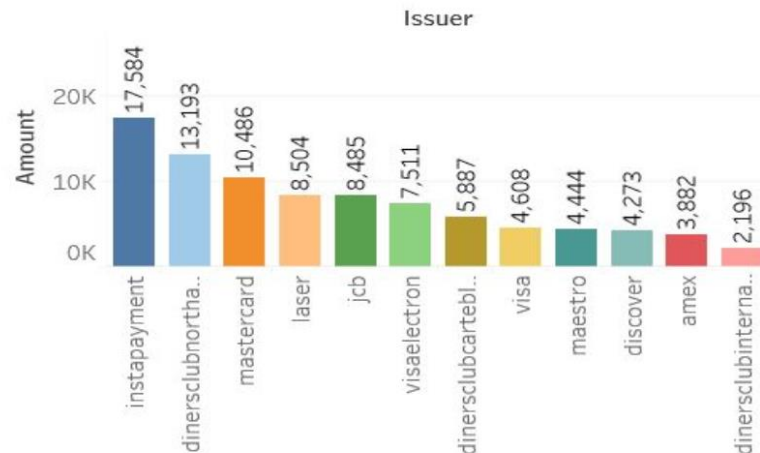
State



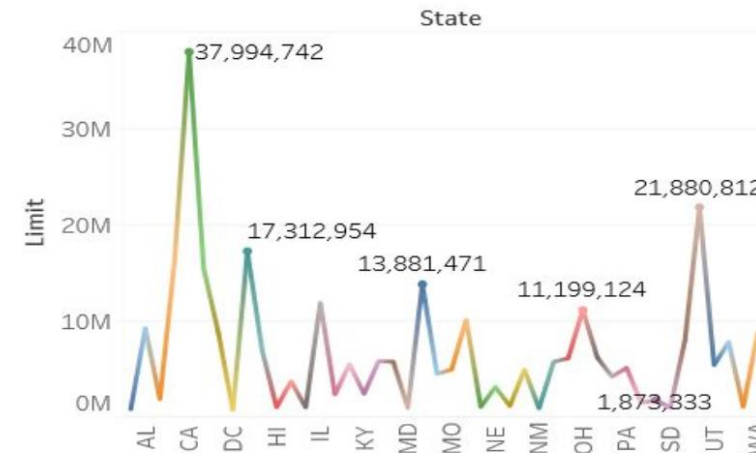
Issuer



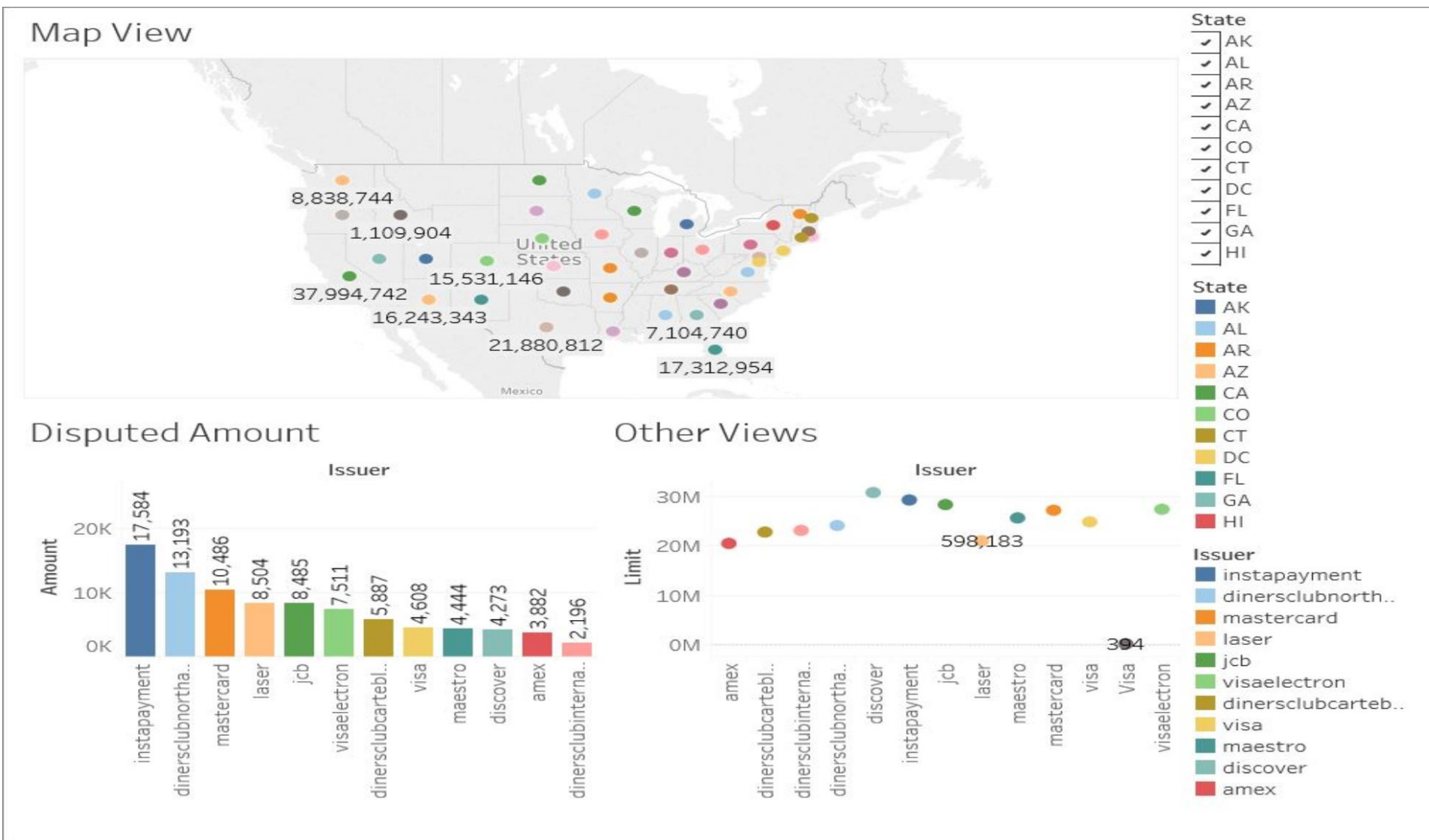
Disputed Amount



Line Graph



# Tableau report: Summary dashboard







# The End