

Digital Transformation with Data Fabric – Watson Query/ Data Virtualization

- 1. Overviews*
- 2. Technical Details*
- 3. Typical Use Case Patterns*

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Goal: Be able to expose any or all of
organization's critical data assets no matter
the location, platform, technology, or schema.

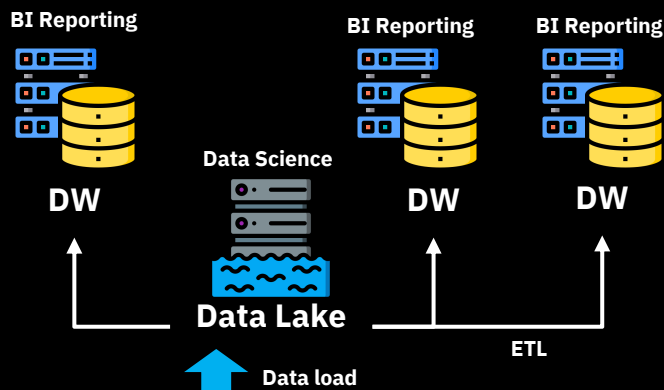
Query 2 or 2,000 data systems with a single
query as One



The Vision of IBM Watson Query

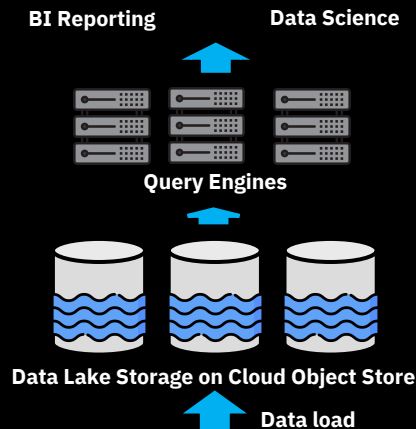
- Ultimately, the goal of Watson Query is to provide the data management experience in Cloud Pak for Data
- Specifically, with a focus on Big Data and how it has evolved in recent years

Classic Big Data Architecture



- Requires many complex data pipelines
- Difficult to scale and maintain
- Duplicates of data
- Isolated BI and Data Science environments

Modern Big Data Architecture



- Scale compute and storage separately
- Handles unstructured and structured data
- Minimal data movement and pipeline
- Single environment for BI and Data Science

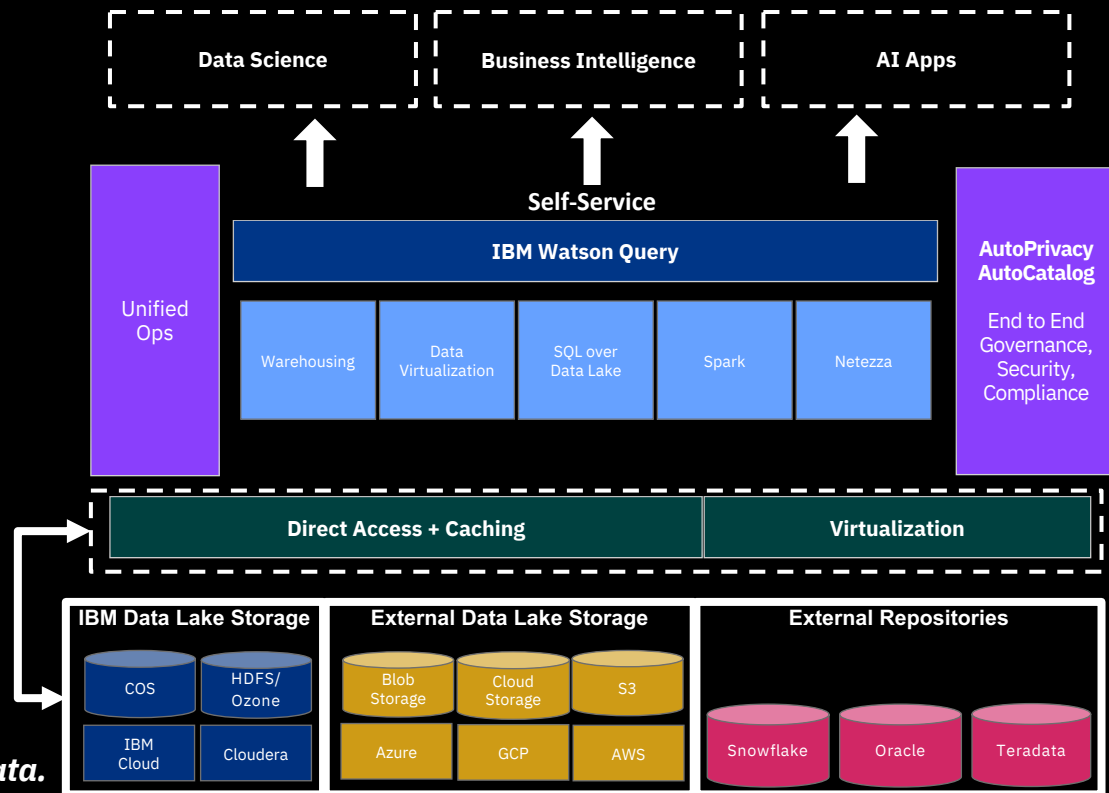
IBM Watson Query

A universal query layer that automates how you access, update and unify data across any source or type (clouds, warehouses, lakes, etc.) without the need for data movement or replication. With intelligent performance optimizations, peta-byte scale and visual query building experiences, it abstracts the complexity of multiple query engines to provide simplified self-service data across an organization

Distributed Query Experience

- **One Query Experience.** Multiple capabilities from virtualization to warehousing
- **End to End Integrated Governance** with AutoCatalog and AutoPrivacy
- **Open Data Formats** to work with data on any cloud and on-prem
- **Petabyte scale** landing, exploration, shaping, governance, and AI
- **Cloud-native** with **consumption pricing**, **instant-on**, and **available** across any zone
- **Fully elastic** with separate compute and storage
- Unified access **without data movement**
- **Hybrid cloud:** Available to deploy on multiple clouds (on prem, private, public)

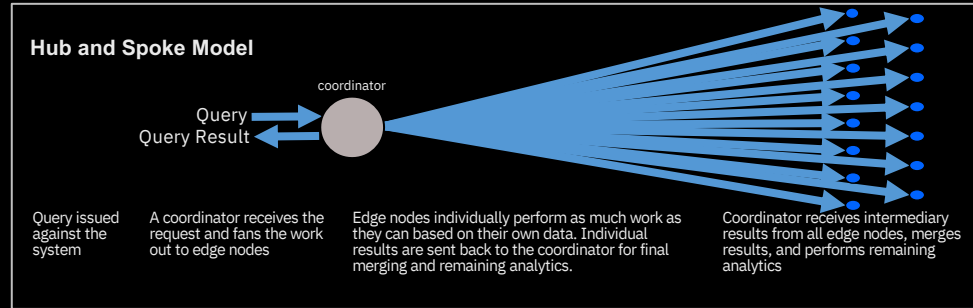
*Any data.
Anywhere.*



Key Architectural Differentiation

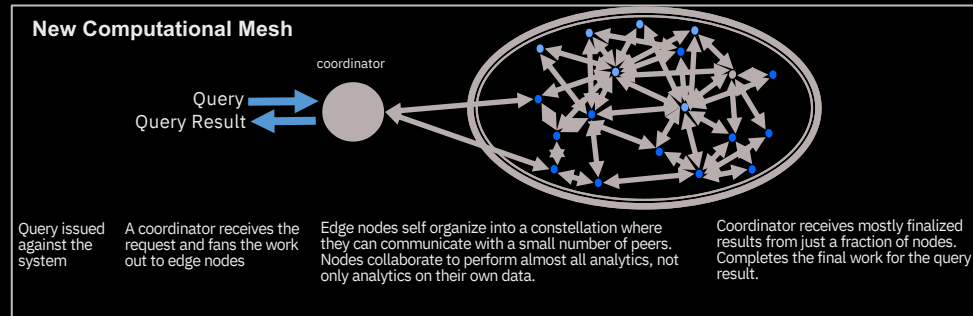
Hub and spoke execution models:

- Lacks scalability
- Performance constrained
- Basis for Federation and our competitors



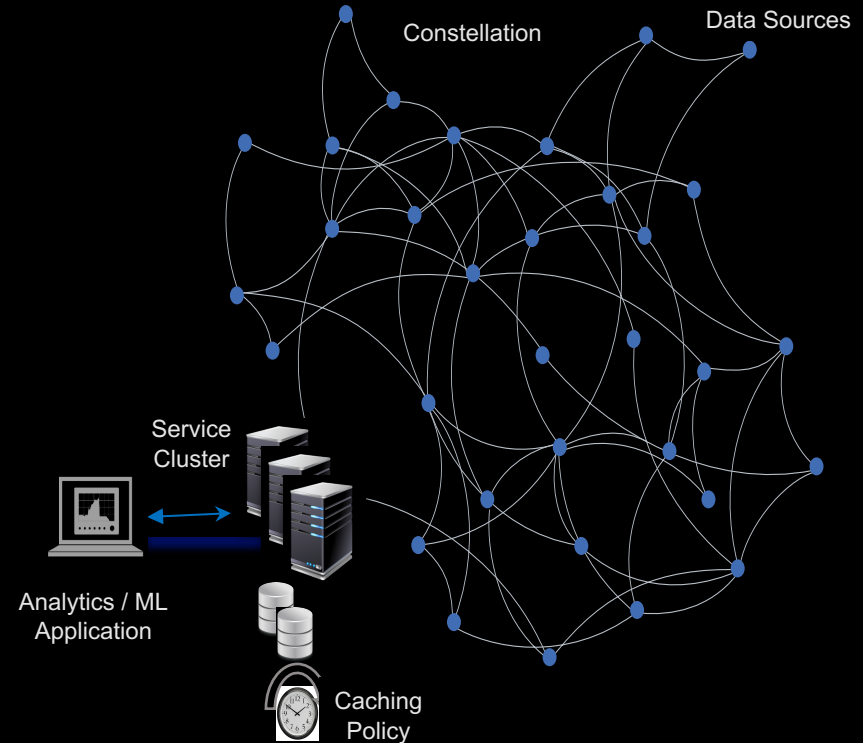
IBM is first to market with a parallel processing model:

- Theoretically unlimited scalability
- Ease of addition/removal of sources
- Execution pushed down into the constellation mesh



Mesh: Remote Connectors and Data Discovery

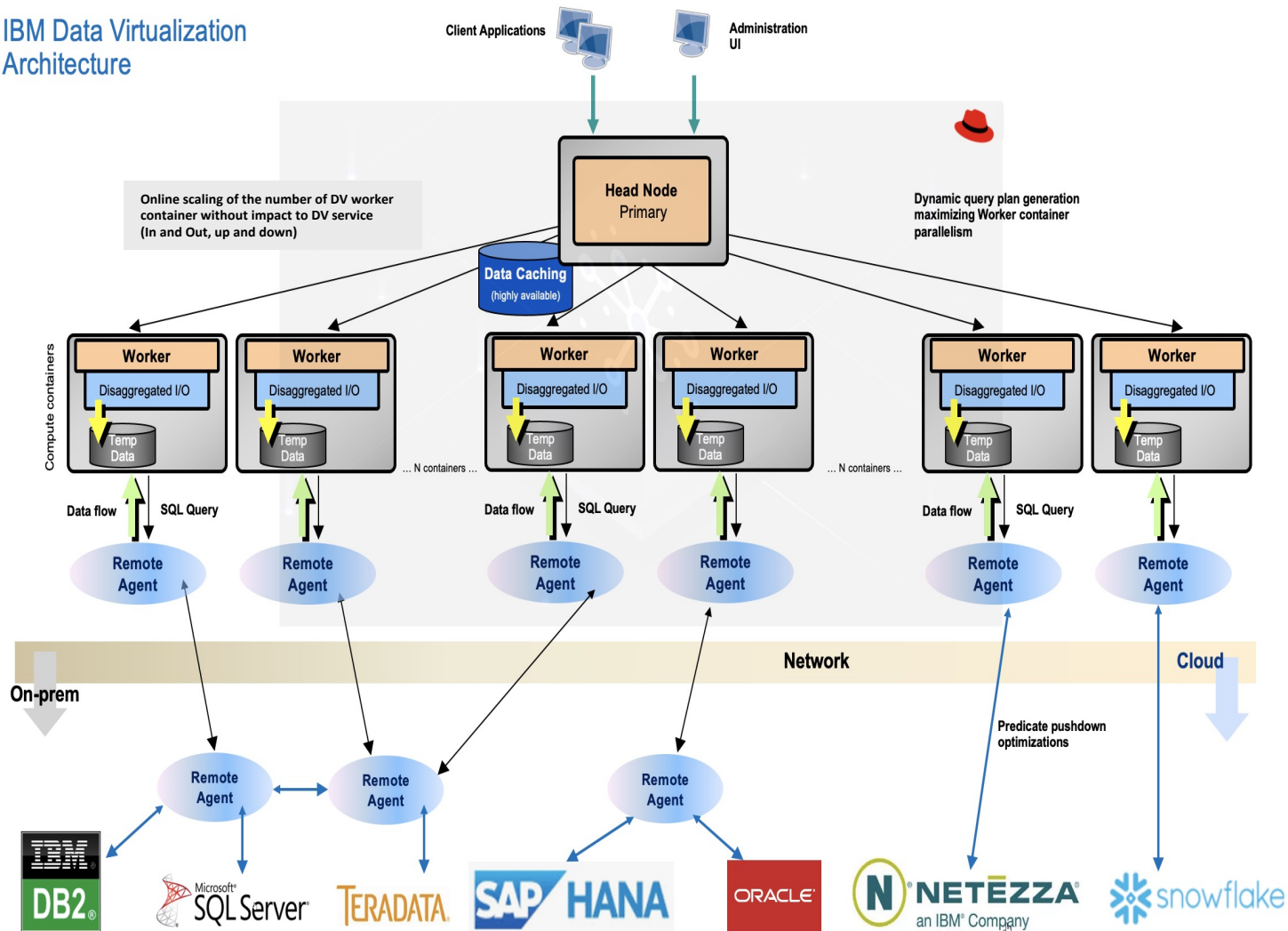
- Parallel processing mesh providing execution performance and scalability:
 - *Quickly deliver analytics results and easily evolve with new data source demands*
- Provides resilient connections between data sources:
 - *Reliability and ability to quickly adapt to increasing business demand*
- Scales seamlessly as new sources are added:
 - *New remote connectors and data sources can be added to the processing mesh without interruption of the service.*
- Provides data source discovery for data sources outside of CP4D
 - *Access to files on disk*
 - *Data sources outside of the cluster.*
- Richness of automation:
 - *Automatic formation and reorganization for best performance.*
- Highly distributed processing:
 - *Parallel access to data and query results.*
 - *Distributed algorithms to improve query performance*



Data Virtualization architecture provides multiple layers that can be tuned according to the workload.

- Multi-worker support in the cluster scales both horizontally and vertically to handle high concurrency and data volumes.
- DV remote agents scale to support higher number of connected data sources and multi-source queries.
- Optimizer dynamically chooses the best number of worker to use for portions of the query based on data sizes and workload

IBM Data Virtualization Architecture



Broad support for common data source types

*More to be added
in the future.*

Cloud Pak for Data

DV 1H 2022, DV aaS MVP on 1H, 2022

- Db2 family for HDM
- Db2 for iSeries, zSeries
- Db2 for z/OS
- Big SQL
- IIAS, PDA (Netezza)
- Informix
- Amazon RDS (Oracle, SQLServer)
- Denodo (Data Virtualization as a source)
- Derby
- Oracle
- SQL Server
- MySQL
- PostgreSQL
- Apache Hive, HDP Hive
- Cloudera Impala
- Teradata*
- MongoDB
- Hive
- Excel, CSV, Text*®
- Sybase
- MariaDB
- Snowflake
- Z Data Sources through IBM DVM Integration
 - VSAM, IMS, CICS, Adabas
- Map-R (Hive)
- BigQuery
- SAP S4/HANA & BW (JDBC / OData connection)
- Amazon Redshift
- Salesforce
- Greenplum
- Apache Spark SQL
- COS / S3

In the roadmap pipeline

- TM1 (REST API)
- Apache Kafka
- Cassandra
- SAS
- JSON
- REST API
- TIBCO (Data Virtualization as a source)
- Interbase
- Apache Drill
- Amazon Dynamo DB, Aurora DB
- CouchDB
- Stream / MQ
- Cloudant
- DataBricks Delta Lake

Key Features

Collaborative Compute Model

Remote Processing and Discovery

Governance Integration

Caching

Schema Folding

Compute Scalability

Data and Result Caching

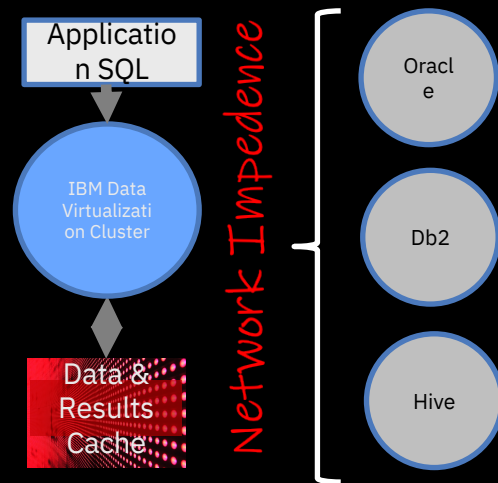
Automated cache recommendations to further optimize query performance-

Powerful

- Cache results (common SQL statements)
- Cache data (data or aggregates, etc).
- Define refresh rate
- Monitor usage/effectiveness

Under the hood

- Advanced query compiler determines whether to use cached data and results for part or all of a query result (MQT & ML based)
- Automation for implementing cache based on your query history

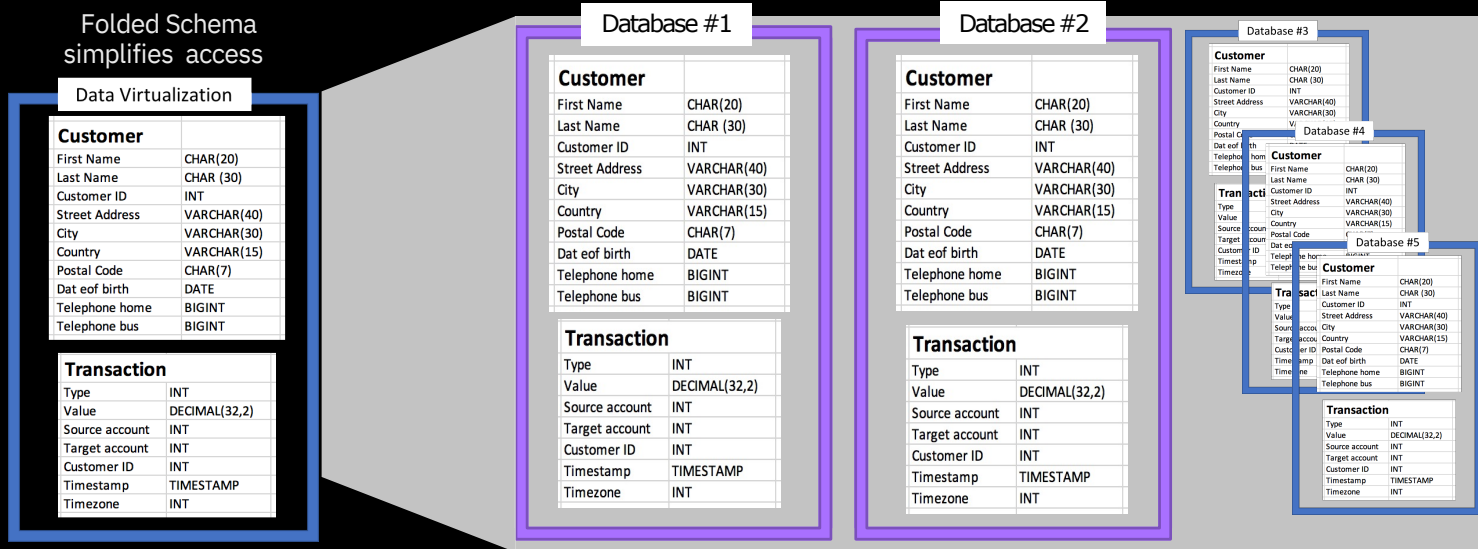


Workflow



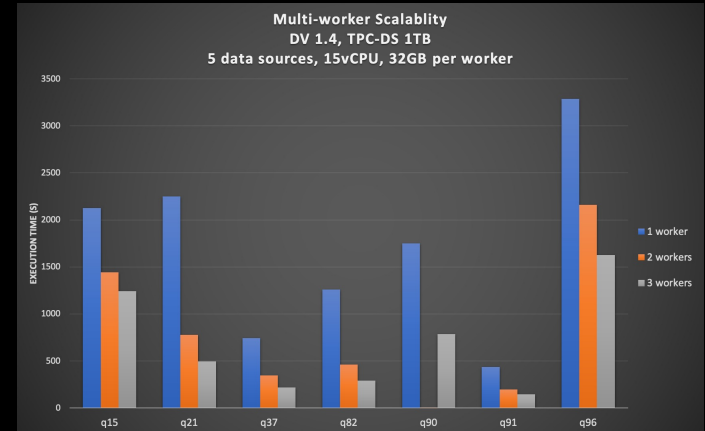
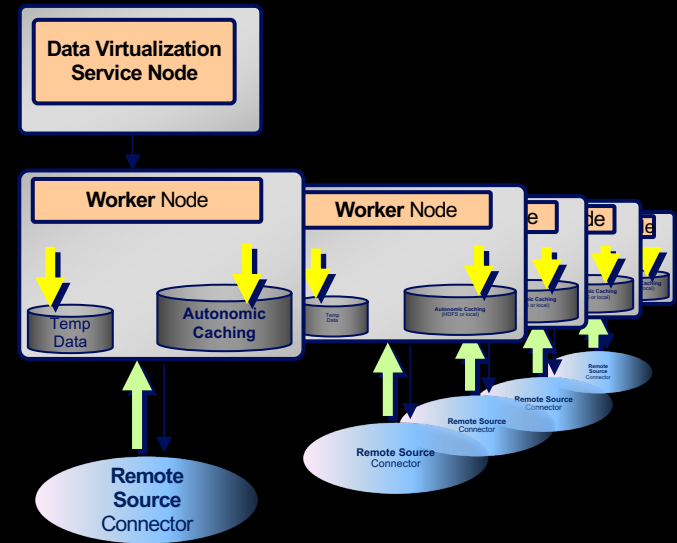
Schema Folding – Simplify Your Data

- Common or similar schemas appear in multiple databases.
 - E.g. branch database for a bank or retailer.



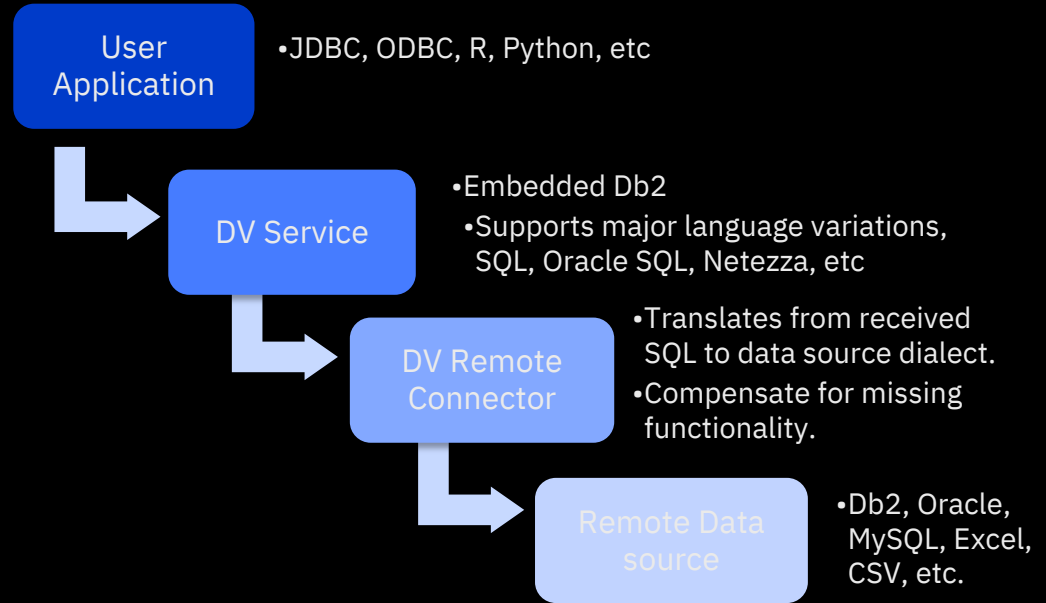
Service Compute Scalability

- Supporting multiple worker nodes to improve query performance for large workloads and data sets.
- Parallelized data fetch from data sources.
- When using remote connectors, additional advantages for network parallelism as data can flow on separate network routes to reach the cluster.



Language Translation in Data Virtualization

- Broad set of data sources supported by Data Virtualization each with unique syntax variations.
- Constellation is not limited only a single data source type. A logical schema is created across all connected sources.
- Multiple levels of translation as we move from the applications through the constellation down to the data source.



Security

Overall approach to Governance Integration and Security.

- Controlled, governed and secure access to virtual data sets within the Cloud Pak for Data Platform

Governance

- Provides data classification (business term) and policy control for virtualized data from any source.
- Data provenance and lineage to show how each source contributes to the analytics.

Security

- Data lives in the original source with only results ever being transmitted.
- Fully encrypted communications between all components of the solution.
- Strong authentication and permission management.
- Policy enforcement and masking capabilities.
- User Group Support *

Policies, via a Runtime Catalog

- Policies can capture corporate data mandates and can have sub-policies
- Additional rules can be associated with policies.
- A data protection rule can be added to the policy so that the policy to protect sensitive data can be enforced.

Data Virtualization Today

Governance Policy and rules apply across

Governance in real-time for all virtual objects

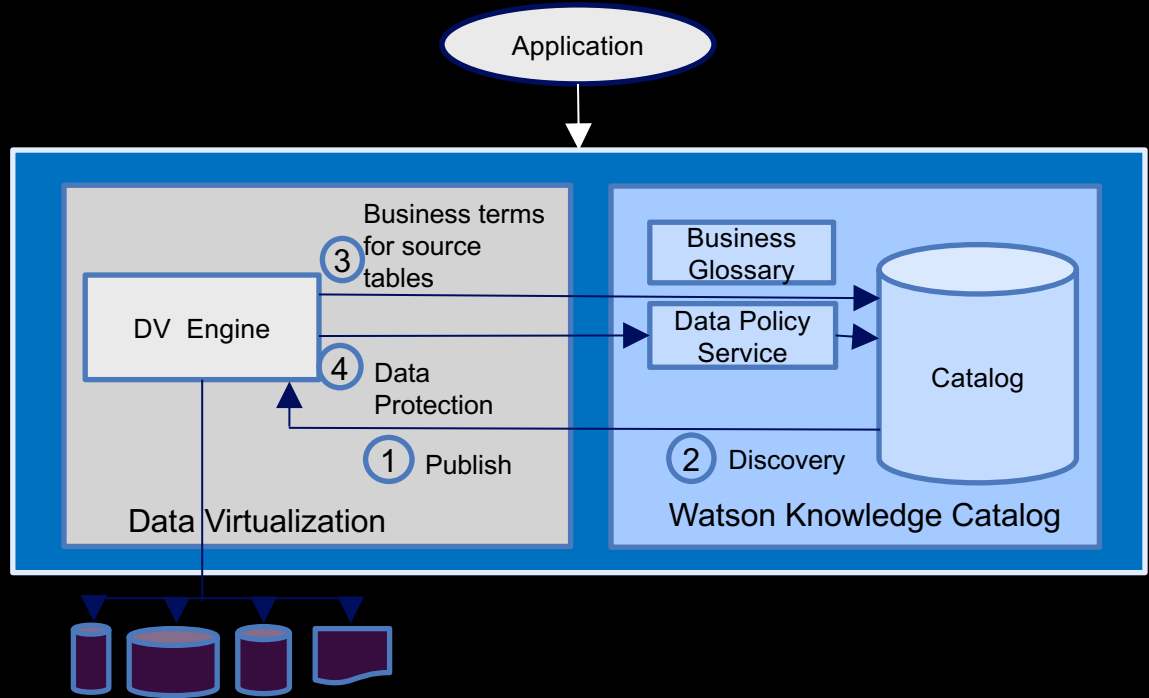
- Govern the Data fabric using policies, data protection rules, or deny policy across all Virtual objects
- Apply masking rules to your virtual objects in real-time
- With deep integration policies and rules result in same behavior when accessed within, or outside of Cloud Pak for Data platform
- Uniformity of enforcement for all virtual objects , irrespective of the Data Sources data type or structure

The screenshot displays the IBM Cloud Pak for Data interface. On the left, a sidebar shows 'My virtualized data / PATIENT'. The main area is divided into two panels. The top panel, titled 'PATIENT', shows metadata: 'Created on: Mar 16, 2020 2:45:39 PM', '7 Columns | 1 Columns masked', and a table structure with columns: SSN (CHAR), USERID (VARCHAR), NAME (VARCHAR), ADDRESS (VARCHAR), PHARMACY (VARCHAR), ACCT_BALANCE (DECIMAL), and PCP_ID (VARCHAR). The bottom panel, titled 'Preview', shows a table with 20 rows of patient data. The data is as follows:

SSN	USERID	NAME	ADDRESS	PHARMACY	ACCT_BALANCE	PCP_ID
XXXXXXXXXX	peter126	Peter Gerry	Oak Wood St	Kroger Pharmacy	335	314-11122
XXXXXXXXXX	kanpeng111	Kan Peng	Cottle Circle	Booths	761	323-63541
XXXXXXXXXX	jones999	Jerry Ho	Almaden Circle	San Jose Pharmacy	2121	193-18232
XXXXXXXXXX	ellen888	Ellen Smiles	Home Court	Placys	121	414-76639
XXXXXXXXXX	jmjam666	Jim Meyers	Chardonway St	Placys Pharmacy	431	124-13247
XXXXXXXXXX	maribowen	Matt Bowen	Boeing Ave	ConcomPharmacy	200	117-34484
XXXXXXXXXX	mark411	Mark Bonner	Celebrity Drive	CVS	244	132-96078
XXXXXXXXXX	kyler500	Kyle Reed	Eden Square	Quest Pharmacy	113	402-11-35765
XXXXXXXXXX	flay128	Tim Flay	Hollywood Court	Walgreens Supercenter Pharmacy	221	916-20161
XXXXXXXXXX	robbie091	Peter Rabbit	London Way	English Pharmaceuticals	1327	321-3838
XXXXXXXXXX	brodt1	Brodley Carr	Fremont Ave	Lucky Pharmacy	1825	943-11292
XXXXXXXXXX	kim1345	Kimberly Penn	500 State St	Walgreens	123.45	123-45678
XXXXXXXXXX	chuck0045	Charles Drew	451 City Avenue	CVS Pharma	397.25	779-32754
XXXXXXXXXX	Moebankley123	Moe Bankley	777 Murghy Avenue	Safeway Pharmacy	265.1	443-19031
XXXXXXXXXX	lily61300	Lily Lai	Sterling Centre Drive	Walgreens	665	410-73651
XXXXXXXXXX	emily222	Emily Cruz	Sea Breeze Court	Walmart Pharmacy	377	210-30274

Integrated Governance

- I. DV Publishes remote assets to WKC.
- II. WKC Discovery performs classification, scoring, term association
- III. DV retrieves Business Terms for the source tables to give the users a common understanding of the data.
- IV. DV obtains information about the policies it needs to enforce upon data access.



What problem are we solving? What's the opportunity?

Exposing Hybrid Data Quickly via Data Fabric (& Key Attributes)

What? Hybrid data fabric for *making existing platforms flexible*

- Use data without knowing format/location, moving or copying

Why? Constant change and need for automated governance

- Ease of query / access to query across sources
- Hybrid: Connect and Access Across Sources
- Scalable and Fast: 1 or 1,000s!
- Distributed: Regional Storage/Governance & Parallel Access
- Governed: Policies applied during search, query, usage

Benefits:

- Time/Effort to Access: from Months to Minutes
- Use of Data: Effective/Proper, in-context
- Time to Value/Innovation: 80% of time spent understanding data
- Tech / Data Modernization: technology modernization/take-out, isolating data impacts (e.g. Data Lakes)

Steps to increase Time-to-Result, with Reduced Effort

1. Connect to Existing Data Assets (DBs, etc.) or Search Cataloged Data Assets
2. If the User/SME doesn't already know the "design", ...
 - Discover and Profile the Quality of Data Assets
 - Discover the De Facto "Design" between Hybrid Sources (PK->FK Key Relationship Analysis)
3. Create a new Virtual Object, Querying Across Data Sources
 - Based on already-known de-facto "design" PK->FK Key Relationships
4. Make Virtual Data Available to Others (Users, Platforms, Applications)

1. Connect to Existing Data Assets (DBs, etc.) or Search Cataloged Data Assets

Menu

Virtualize

Browse for:

Tables

Files

View cart (0)

Filters

Available tables 433 tables

Databases

Find tables by name, schema, or column

Automatically group tables

Add to cart

IBM Db2 Family (414)

mongo MongoDB (19)

Informix (3)

IBM BigSQL (0)

IBM Db2 Event Store (0)

Derby (0)

z/OS data source (non-Db2z) (0)

Hive (0)

Table	Schemas	Databases	Grouped tables
MORTGAGE_JOIN	DB2INST1,DB2INST1,DB2INST1	MORTGAGE,MORTGAGE,MORTGAGE	3
MORTGAGE_CUSTOMER	DB2INST1		
MORTGAGE_DEFAULT	DB2INST1		
MORTGAGE_PROPERTY	DB2INST1		
BindingDimensions	DASH100		
CUSTOMER	DASH100		
DebiasedFairnessMetrics	DASH100		
DeploymentDimensions	DASH100		
DeploymentLatestMetrics	DASH100		
Explanations	DASH100		

Menu

My virtualized data

mort

Tables

MORTGAGE_CUSTOMER_DB2

IBM Cloud Pak for Data

Not secure

zen-cpd-zen.apps.cpd-cluster-demo2.demo.ibmcloudpack.com/zen/#/dataVirtualization/connections

Apps

Work

Personal

Watson AI Examples

Data Science

IBM WebEx

IBM Cloud

To do

IBM Cloud Pak for Data

All

Data virtualization

IBM Cloud Pak for Data

zen-cpd-zen.apps.cpd-cluster-demo2.demo.ibmcloudpack.com/zen/#/dataVirtualization/console|myData

AppsWorkPersonalWatson AI ExamplesData ScienceIBM WebExIBM CloudTo do

IBM Cloud Pak for DataAllSearch

Data virtualization

Menu | My virtualized data

mortx

Table

Schema

Created on

☒

MORTGAGE_CUSTOMER_DB2

DB2

Dec 13, 2019 6:12:12 PM

☐

MORTGAGE_JOIN_DB2

DB2

Dec 12, 2019 9:59:59 PM

☐

MORTGAGE_RISK_PRED_DB2

DB2

Dec 12, 2019 9:59:59 PM

☒

MORTGAGE_PROPERTY_MONGO

MONGO

Dec 12, 2019 9:56:20 PM

☐

mortgage_default_informix

INFORMIX

Dec 12, 2019 9:56:19 PM

☐

MORTGAGE_CUSTOMER_MONGO

MONGO

Dec 12, 2019 9:56:19 PM

AssignJoin view

If needed, Discover and Profile the Quality of Data Assets

IBM Cloud Pak for Data

Projects > AA_Dan0629a > Data assets > BANK_CLIENTS

Columns Governance Data quality Data classes Data types Rules Primary keys Foreign keys

BANK_CLIENTS

Description

Overall Description for BC manually added

7/16/2022... Show more

Data quality score 96%

Columns 17

Rows 5112

Reviewed

Threshold 80%

Analysis status Completed

Last analysis Jul 16, 2020

Find a column

Name (physical)	Score	Delta
SQL170621015...	100%	0%
CLIENT_ID	100%	0%
NAME	98%	0%
ADDRESS	88%	0%
ZIP	81%	0%
AGE	92%	0%
GENDER	100%	0%
MARITAL_STATUS	90%	0%
PROFESSION	97%	0%
NBR_YEARS_CLI	99%	0%
SAVINGS_ACCO...	100%	0%
ONLINE_ACCESS	100%	0%
JOINED_ACCOU...	100%	0%
BANKCARD	100%	0%

Columns (17)

Search for a column

	Name	Analysis status	Last analyzed	Data class	Term	Format	Nullability	Uniqueness	Minimum	Maximum	Distinct values
<input type="checkbox"/>	ACCOUNT_ID	Completed	28 days ago	Account Number							
<input type="checkbox"/>	ACCOUNT_TYPE	Completed	28 days ago	Indicator							
<input type="checkbox"/>	ADDRESS	Completed	28 days ago	Text	Address 100%						
<input type="checkbox"/>	AGE	Completed	28 days ago	Code	Age 100%						
<input type="checkbox"/>	AVERAGE_BALANCE	Completed	28 days ago	Quantity							
<input type="checkbox"/>	BANKCARD	Completed	28 days ago	Boolean							
<input type="checkbox"/>	CLIENT_ID	Completed	28 days ago								
<input type="checkbox"/>	GENDER	Completed	28 days ago	Gender	Gender 100%						
<input type="checkbox"/>	JOINED_ACCOUNTS	Completed	28 days ago	Boolean							
<input type="checkbox"/>	MARITAL_STATUS	Completed	28 days ago	Legal Marital/Civil Status...	Marital Stat...						
<input type="checkbox"/>	NAME	Completed	28 days ago	Person Name	Name 100%						
<input type="checkbox"/>	NBR_YEARS_CLI	Completed	28 days ago	Code							
<input type="checkbox"/>	ONLINE_ACCESS	Completed	28 days ago	Boolean							

IBM Cloud Pak for Data

Projects > Austin_CS_demo

Dashboard Data assets Data rules Relationships Column similarity Settings

Austin_CS_demo

Description

No description.

Data assets 27

PII data assets 0/27

Reviewed data assets 0/27

Connections 3

Critical data issues 0

Created by admin

Last modified Jun 18, 2020

Governed

Sampling enabled

Data quality threshold

18%

27

44%

37%

No quality score

Conformed

No threshold

IBM Cloud Pak for Data

Data discovery > Results

Results for qs_1590090084338

Discovery insights

Data quality insights

Business term assignment

Assigned 4.9

Suggested 44.28

Unassigned 95.3

percentage

Data class assignment

Assigned 40.03

Suggested 26.26

Unassigned 39.97

percentage

All business terms (33)

Name	Columns	Tables	Schemas	% assigned data class	% suggested data class	Assigned data class	Suggested data class
Age	12	0	0	75%	67%	Identifier	US Zip Code
Application	12	1	0	46%	46%	Identifier	Person Name
Name	5	0	0	40%	60%	Text	Person Name

Data analysis

Key relationship

Overlap analysis

Analyzed

Error

Not analyzed

Outdated

In progress

In queue

Candidate

Selected

None

If needed, Discover the De Facto “Design” between Hybrid Sources

(PK-

The screenshot displays the IBM Cloud Pak for Data Relationships interface. The top navigation bar includes 'Dashboard', 'Data assets', 'Data rules', 'Relationships', 'Column similarity', and 'Settings'. The 'Relationships' tab is active, showing a 'Data asset relationships chart' and a table of 'Found 5 relationships'.

Relationships

Customize display Run analysis

Filter by:

- ☐ Selected
- ☒ Candidate
- ☐ Rejected

Find data assets

☐ Data assets (6)

- ☒ ACCOUNT_HOLDERS
- ☒ BANK_ACCOUNTS
- ☐ BANK_CLIENTS
- ☒ BANK_CUSTOMERS
- ☒ CHECKING_ACCOUNTS
- ☒ SAVINGS_ACCOUNTS

Data asset relationships chart

Display relationships: Key Overlap

Zoom in Zoom out Fit to page Print Export as

Relationships Chart: The chart shows six data assets: BANK_ACCOUNTS, BANK_CLIENTS, BANK_CUSTOMERS, SAVINGS_ACCOUNTS, CHECKING_ACCOUNTS, and ACCOUNT_HOLDERS. Relationships are indicated by lines connecting the assets. For example, BANK_CLIENTS is connected to SAVINGS_ACCOUNTS and CHECKING_ACCOUNTS. BANK_ACCOUNTS is connected to SAVINGS_ACCOUNTS. BANK_CUSTOMERS is connected to ACCOUNT_HOLDERS. SAVINGS_ACCOUNTS is connected to CHECKING_ACCOUNTS. ACCOUNT_HOLDERS is connected to CHECKING_ACCOUNTS.

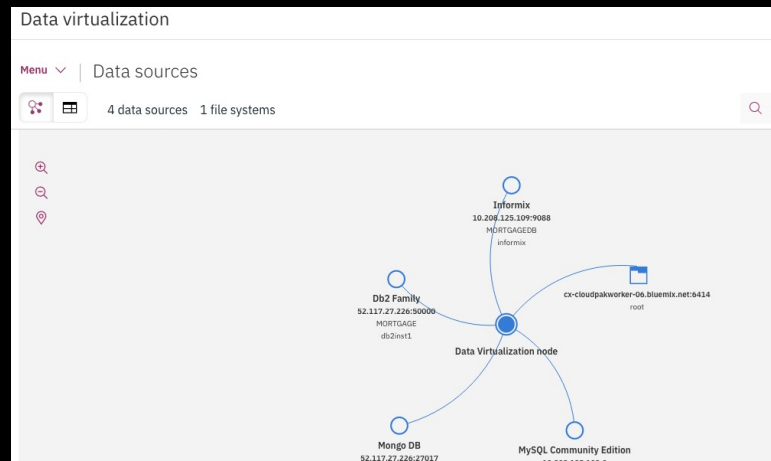
Found 5 relationships

<input type="checkbox"/>	Parent data asset	Primary key	Columns	Child data asset	Foreign key	Parent to child	Child to parent	Confidence	Status	Last n	Set status	Remove relationship
<input checked="" type="checkbox"/>	BANK_CLIENTS	ACCOUNT_ID	1	SAVINGS_ACCOUNTS	ACCOUNT_ID	43% (2213 / 5112)	100% (2213 / 2213)	71%	Candidate	6/29/2020, 10:03 AM	Selected	
<input type="checkbox"/>	BANK_ACCOUNTS	ACCOUNT_ID	1	SAVINGS_ACCOUNTS	ACCOUNT_ID	62% (2213 / 3532)	100% (2213 / 2213)	81%	Candidate	6/29/2020, 10:03 AM	Rejected	
<input type="checkbox"/>	BANK_ACCOUNTS	ACCOUNT_ID	1	CHECKING_ACCOUNTS	ACCOUNT_ID	62% (2199 / 3532)	100% (2199 / 2199)	81%	Candidate	6/29/2020, 10:03 AM		
<input type="checkbox"/>	BANK_CUSTOMERS	CUSTOMER_ID	1	ACCOUNT_HOLDERS	ACCOUNT_HOLDER_ID	97% (2941 / 3008)	100% (2941 / 2941)	98%	Candidate	6/29/2020, 10:03 AM		
<input type="checkbox"/>	BANK_CLIENTS	ACCOUNT_ID	1	CHECKING_ACCOUNTS	ACCOUNT_ID	43% (2200 / 5112)	100% (2199 / 2199)	71%	Candidate	6/29/2020, 10:03 AM		

Items per page: 10 | 1-5 of 5 items

1 of 1 pages

3. Create a new Virtual Object, Querying Across Data Sources (based on de-facto “design” PK->FK Key Relationships)



Data virtualization

Menu | Virtualize

Browse for: Tables Files

Find tables by name, schema, or column

Filters Available tables Automatically group tables

Databases 36 tables

Table	Schemas	Databases	Grouped tables
MORTGAGE_JOIN	DB2INST1	MORTGAGE	1
MORTGAGE_CUSTOMER	DB2INST1.ICPD_MONGO	MORTGAGE.icpd_mongo	2
MORTGAGE_DEFAULT	DB2INST1.ICPD_MONGO	MORTGAGE.icpd_mongo	2
MORTGAGE_PROPERTY	DB2INST1.ICPD_MONGO	MORTGAGE.icpd_mongo	2
sysdomains	"informix"	MORTGAGEDB	1

Join virtual objects

Join two columns by selecting a column from one table and then dragging your cursor to a column in the other table.

Table 1: CS_MORTGAGE_PROPERTY

Find	Column Name	Data Type
<input checked="" type="checkbox"/>	ID	DOUBLE
<input checked="" type="checkbox"/>	LOCATION	INTEGER
<input checked="" type="checkbox"/>	SALE_PRICE	INTEGER

Table 2: CS_MORTGAGE_CUSTOMER

Find	Column Name	Data Type
<input checked="" type="checkbox"/>	APPLIED_ONLINE	VARCHAR
<input checked="" type="checkbox"/>	CREDIT_CARD_DEBT	DOUBLE
<input checked="" type="checkbox"/>	ID	DOUBLE
<input checked="" type="checkbox"/>	INCOME	DOUBLE
<input checked="" type="checkbox"/>	LOANS	DOUBLE
<input checked="" type="checkbox"/>	LOAN_AMOUNT	DOUBLE

IBM Cloud Pak for Data


Not secure zen-cpd-zen.apps.cpd-cluster-demo2.demo.ibmcloudpack.com/zen/#/dataVirtualization/console/jmyData%2FcreateJoinView%2Fmortgage_customer_db2inst1mortgage_prop...

IBM Cloud Pak for Data

SQL editor

```
*Untitled - 1
1 CREATE VIEW VIEW_NAME
2 AS
3 SELECT "DB2"."MORTGAGE_CUSTOMER_DB2"."APPLIED_ONLINE" AS "DB2_MORTGAGE_CUSTOMER_DB2_APPLIED_ONLINE", "DB2"."MORTGAGE_CUSTOMER_DB2"."CARD_DEBT" AS "DB2_MORTGAGE_CUSTOMER_DB2_CARD_DEBT", "I
4 FROM "DB2"."MORTGAGE_CUSTOMER_DB2", "MONGO"."MORTGAGE_PROPERTY_MONGO"
5 WHERE "DB2"."MORTGAGE_CUSTOMER_DB2"."ID"="MONGO"."MORTGAGE_PROPERTY_MONGO"."ID" AND "CURRENT_LOANS" = 1
```

4. Make Virtual Data Available to Others (Users, Platforms, Applications)

 Data virtualization

Menu ▾ | Connection details

LinuxMacPowerLinuxWindowszLinux

Instructions

1

[Download Linux Driver Package](#)

File name:
ibm_data_server_driver_package_linuxx64.tar.gz (74 MB)

2

Run the following example commands to decompress the
ibm_data_server_driver_package_linuxx64.tar.gz file:

gunzip ibm_data_server_driver_package_linuxx64.tar.gz

tar -xvf ibm_data_server_driver_package_linuxx64.tar.gz

A dsdriver subdirectory is created.

3

Extract the Java and ODBC/CLI drivers by running the following command from the dsdriver directory:

./installDSDriver

The **installDSDriver** command creates the db2profile and db2cshrc script files in the dsdriver directory.

4

Run the script file for your shell environment:

Connection configuration resources


☒ With SSL ☐ Without SSL

Host name: zen-cpd-zen.apps.cpd-cluster-demo2.demo.ibmcloudpack.com
Port number: 30558
Database name: bigsql
User ID: user999
Version: Compatible with Db2, Version 11.1.0 or later
Instance ID: d4b76754-64eb-47a1-9d2d-e1b1f83c0f1e

[Download SSL Certificate](#)

JDBC string

jdbc:db2://zen-cpd-zen.apps.cpd-cluster-demo2.demo.ibmcloudpack.com:30558/bigsql:user=user999

 Copy JDBC String

More information

[Db2 driver package \(IBM Knowledge Center\)](#)[IBM Data Server Client Packages](#)[Connecting CLPPlus to a Db2 database \(IBM Knowledge Center\)](#)

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