How to Modernize the IMS Queries Landscape with IDAA

Session C12

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Agenda

- Background / History
- Existing client interest & use cases
- The solution for IMS data in DB2 Analytics Accelerator
- Implementation Steps
- IMS Lab POT
  - InfoSphere DataStage
  - DB2 Analytics Accelerator Loader for z/OS Tool
- Demo
- Resources
- Hands on Lab

Ah, The Good Ol' Days

- ETL IMS data into data warehouses
- Queries submitted to the data warehouse
- Queries ran forever
- DBAs spent hours analyzing & fine tuning the SQL queries

Why we did what we did

- Back then IMS had no query capability
  - Query capability via JDBC started in IMS V7 & further solidified with IMS Open database feature
- Netezza – high performance data warehouse appliances
  - Founded in 2000 and in 2010 IBM announced its acquisition

IBM zEnterprise and DB2 Analytics Accelerator

Driving revolutionary change

Transaction Processing

Analytics Workload

The hybrid computing platform on zEnterprise

- *Supports transaction processing and analytics workloads concurrently, efficiently and cost-effectively*
- *Delivers industry leading performance for mixed workloads*

DB2 Analytics Accelerator and DB2 for z/OS

A self-managing, hybrid workload-optimized database management system that runs each query workload in the most efficient way, so that each query is executed in its optimal environment for greatest performance and cost efficiency

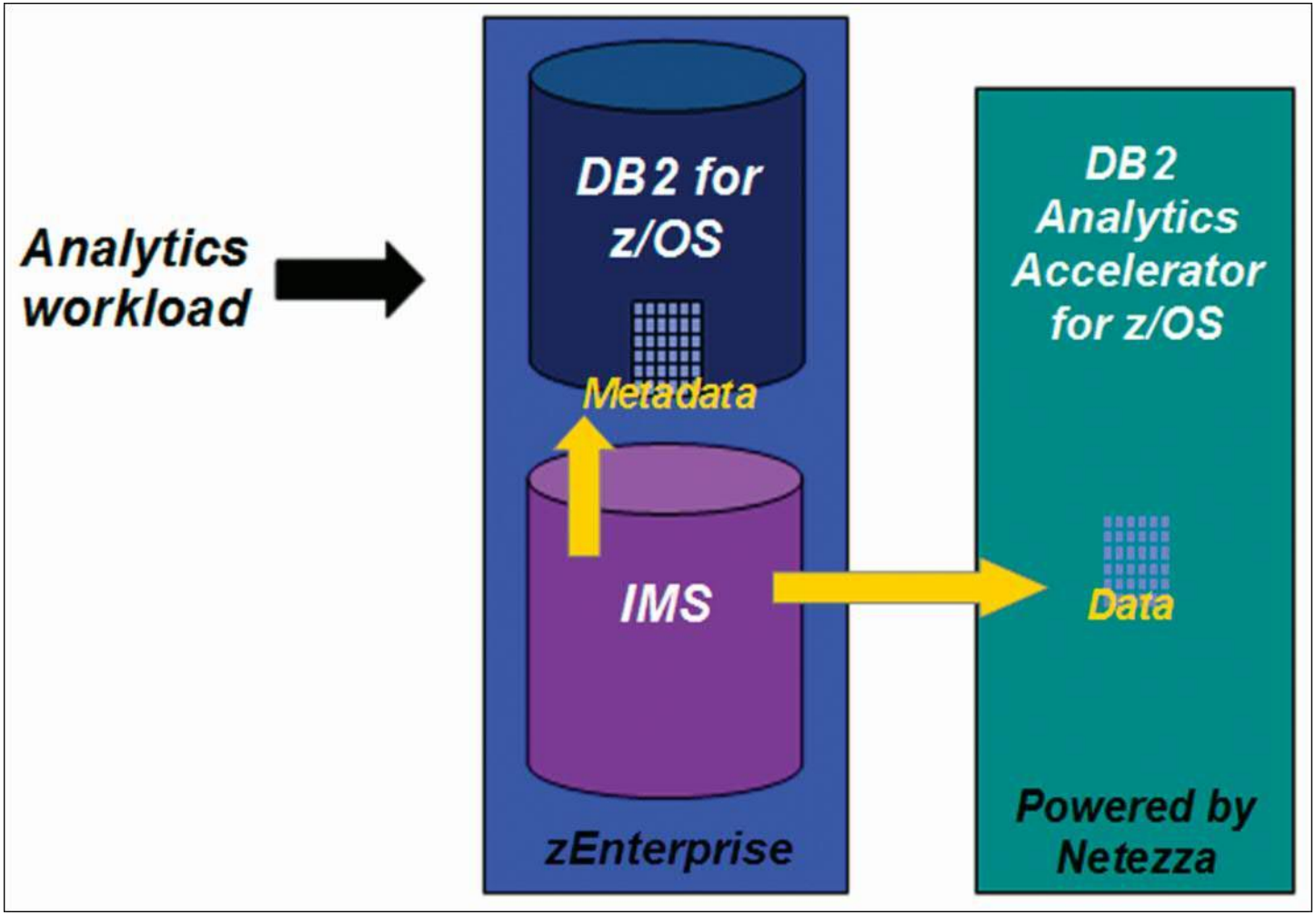
Existing Client Interest …

- Major Insurance Co with both IMS and DB2
- Recently did a very successful POC & going into production:
  - Loaded IMS & DB2 data into DB2 Analytics Accelerator
  - Ran queries against both IMS & DB2 data
- Financial Institution in the middle east
  - Currently ETL IMS data to Exadata
  - Successful POC – putting data into DB2 Analytics Accelerator
- Financial Institution in Japan & another in Europe
  - Expressed interest

Existing Client use cases

- Responding to clients with customized large scale ad-hoc reports
- Personalized responsiveness to clients determined via Analytics
  - Financial Institutions storing older data in HPSS
  - Analytics:
    - What type of transactions are performed at branches
    - What type of transactions customers perform, etc.
- Ensuring Data Quality / Data Integrity

The Solution: Routing IMS Queries thru DB2



Advantages of routing queries thru DB2:

1. Single point of entry for system z server-wide analytics and reporting queries

2. Clients can do joins between IMS and DB2 for z/OS data

3. IMS Performance is not impacted

Implementation steps (the simplistic view):

1. Extract and Transform IMS data
   - Transform because of special data types e.g. Packed decimal Date types in IMS

2. Define the IMS Tables (segments) to both DB2 and DB2 Analytics Accelerator

3. Load the IMS data into DB2 Analytics Accelerator only (no data needs to be loaded into DB2)
   - As often as the client wishes

4. Enable query for acceleration

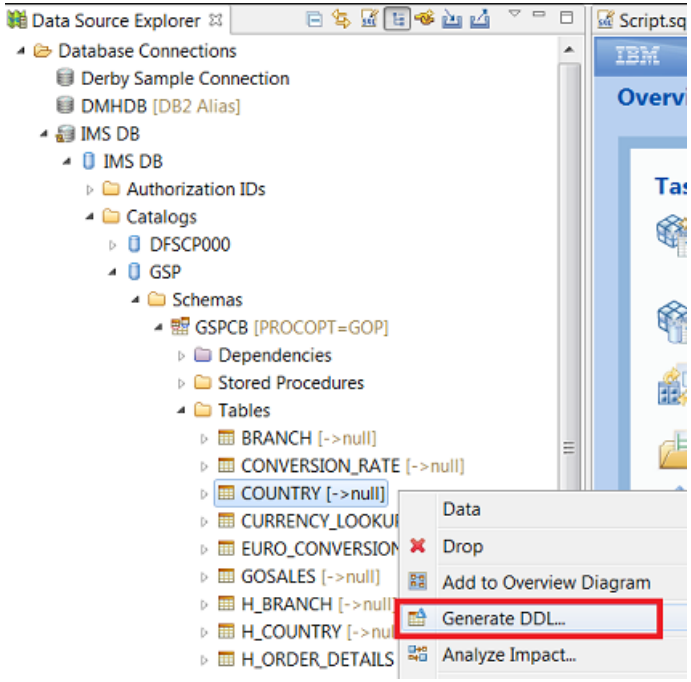
Implementation steps (a little more detail):

1. **Extract & Transform IMS data**
   - Options:
     - User written program
     - ETL Tool: IBM InfoSphere DataStage Product

Implementation steps (a little more detail): …

2. Define the IMS Tables (segments) to DB2 & DB2 Analytics Accelerator

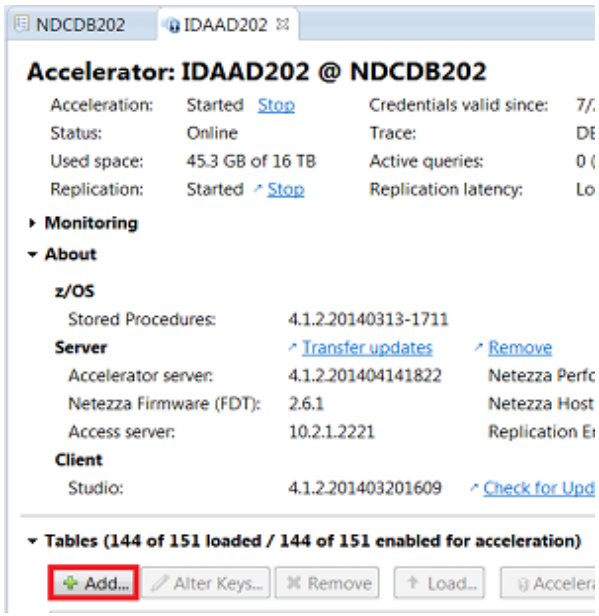
- Defining to DB2 done via execution of DDL (thru SPUFI for example)
  - The DDL can be generated by the *IMS Explorer for development*:

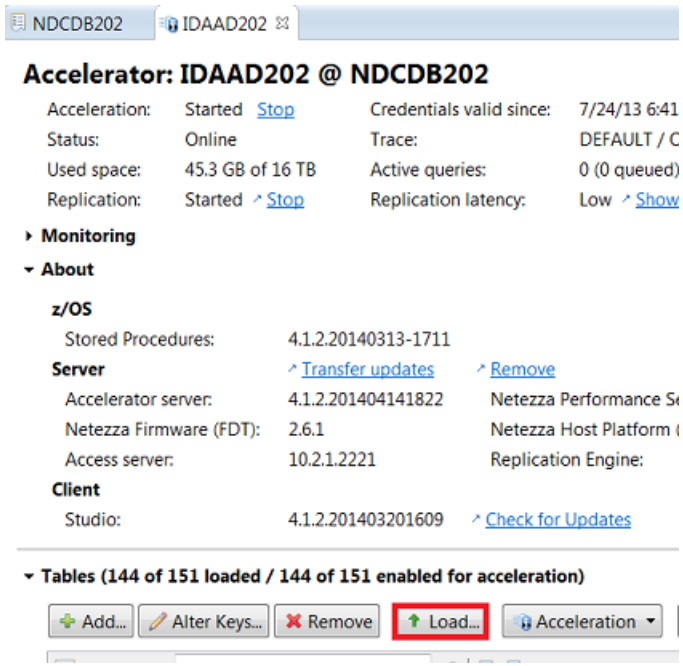


Implementation steps (a little more detail):

2. Define the IMS Tables (segments) to DB2 & DB2 Analytics Accelerator

- Defining to DB2 done via execution of DDL (thru SPUFI for example)
- Defining to DB2 Analytics Accelerator is a simple matter of executing ACCEL_ADD_TABLES stored procedure (can use Accelerator Studio GUI)





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Implementation steps (a little more detail):

3. Load the IMS data into DB2 Analytics Accelerator.
    - Use the DB2 Analytics Accelerator Loader for z/OS Tool (to load into Accelerator only)
        - Note the extracted data has to be in a format that the DB2 Analytics Accelerator Loader for z/OS tool expects

Implementation Options

- OPTION 1:

Extract and transform IMS data **via a custom application** and then

Load the data into DB2 Analytics Accelerator only using the DB2 Analytics Accelerator Loader for z/OS tool

Implementation Options

- OPTION 2:

Extract and transform IMS data using **IBM InfoSphere DataStage or similar ETL** tool &

Load the data into DB2 Analytics Accelerator only using the DB2 Analytics Accelerator Loader for z/OS tool

Implementation Options

- OPTION 3: IMS → DB2 → IDAA

Extract and transform IMS data using IBM InfoSphere DataStage tool

Load the extracted data into DB2 from DataStage using the DB2 Connector stage

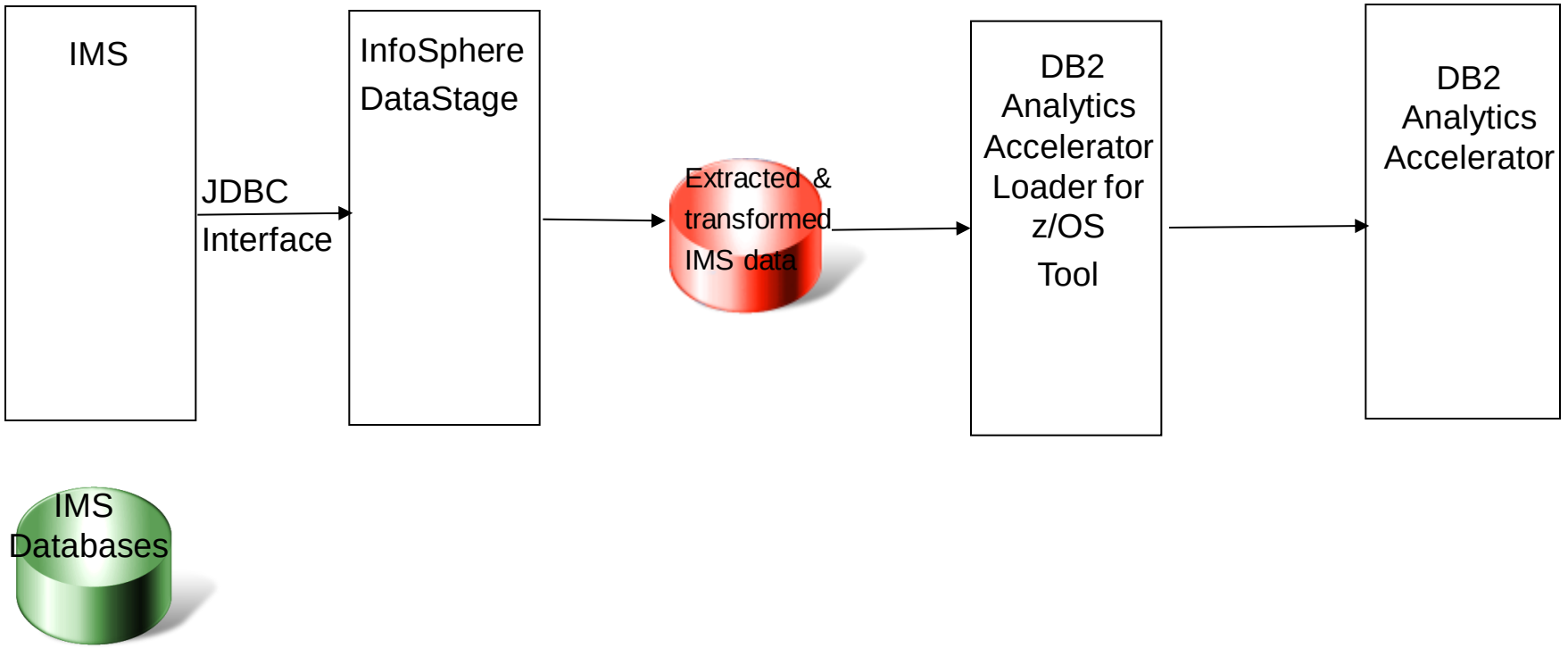
Load the data from DB2 into DB2 Analytics Accelerator using the Accel_Load_Tables stored procedure

- Cons: Data Duplication
- Pros: No need for DB2 Analytics Accelerator Loader for z/OS tool

  For near real time analytics, could propagate changes to IMS data (using CDC)

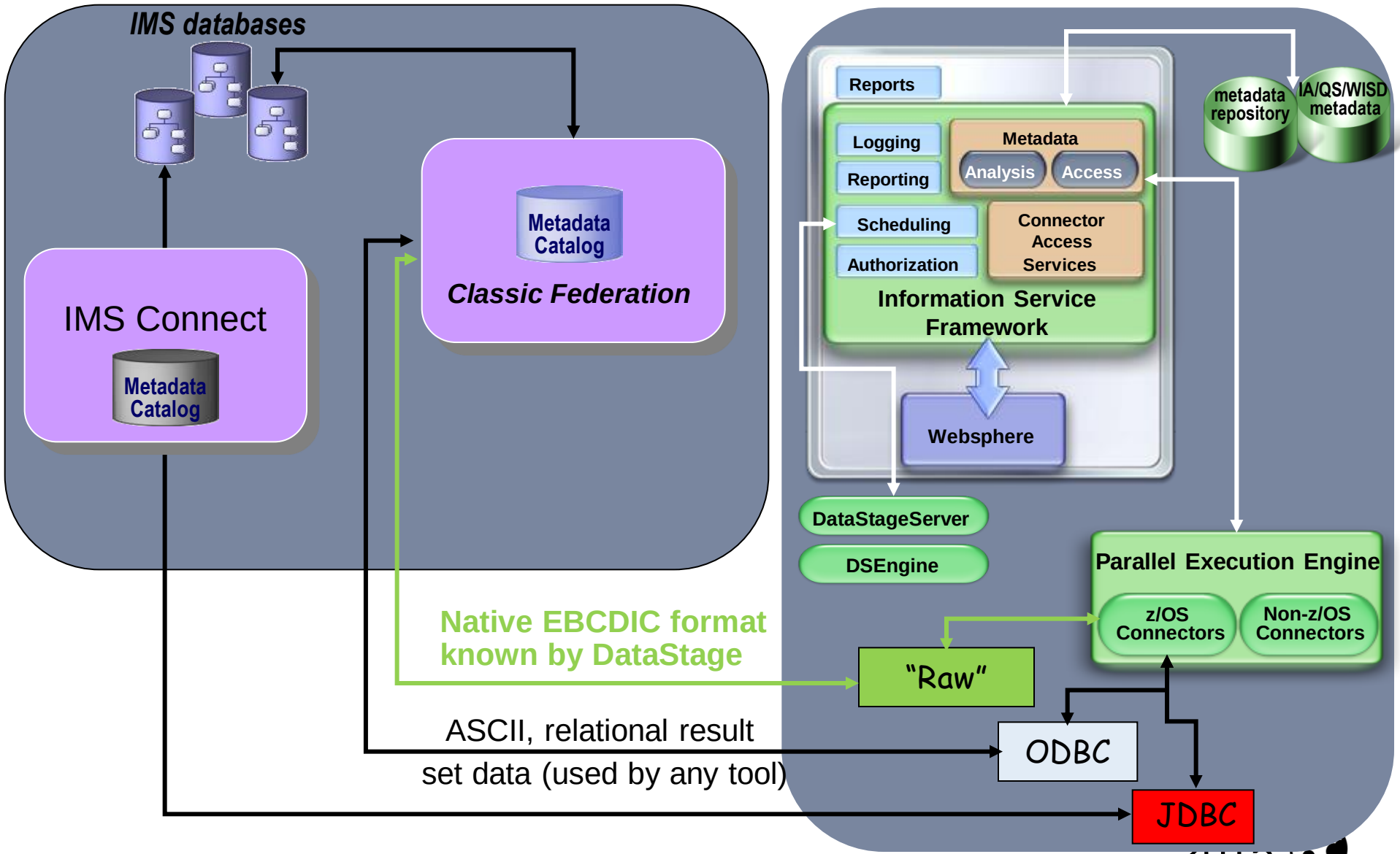
  from IMS to DB2 to DB2 Analytics Accelerator. For this case, don't need the DB2 Analytics Accelerator Loader for z/OS tool & don't need Datastage, just use InfoSphere Replication

IMS Lab POT



Extraction and transformation via DataStage

IMS Access Integration with DataStage – Classic Federation



Setting up DataStage

1. Need to use DataStage 9.1.2 (for the JDBC interface to IMS)

2. DataStage has a client piece & a server piece
   - Client piece: DataStage Designer (on Windows)
   - Server piece: ran it on zLINUX SuSE but could be run on distributed

3. Make the IMS JDBC drivers available to the DataStage server
   - http://pic.dhe.ibm.com/infocenter/iisinfsv/v9r1/topic/com.ibm.swg.im.iis.conn.jdbc.usage.doc/topics/jdbc_config_driver.html

4. And that's it!!

Using DataStage

1. Use InfoSphere Metadata Asset Manager (IMAM) to import IMS metadata from the IMS Catalog – you need IMS Catalog installed!!

2. Using the DataStage Designer client piece to design a job to do the Extract & transform

3. Compile & run the job.

4. The job will produce a file of extracted & transformed data.

Transformation with DataStage

- DataStage has many built-in functions:
  - DateFromJulianDay – returns a date from the given Julian date
  - DecimalToString – returns the string representation of the given decimal.

- Transformer Routines
  - Custom developed routines
  - Written in C++
    - Code the routine
    - Compile it with the required flags
    - Put the output file in a shared dir
    - Link it in DataStage
    - Use it in the transformer stage like any other function

- Recommendation: use the Complex Flat File to store the extracted & transformed data
  - Easier to set the EBCDIC & binary representation formats

Defining IMS tables to DB2 & DB2 Analytics Accelerator

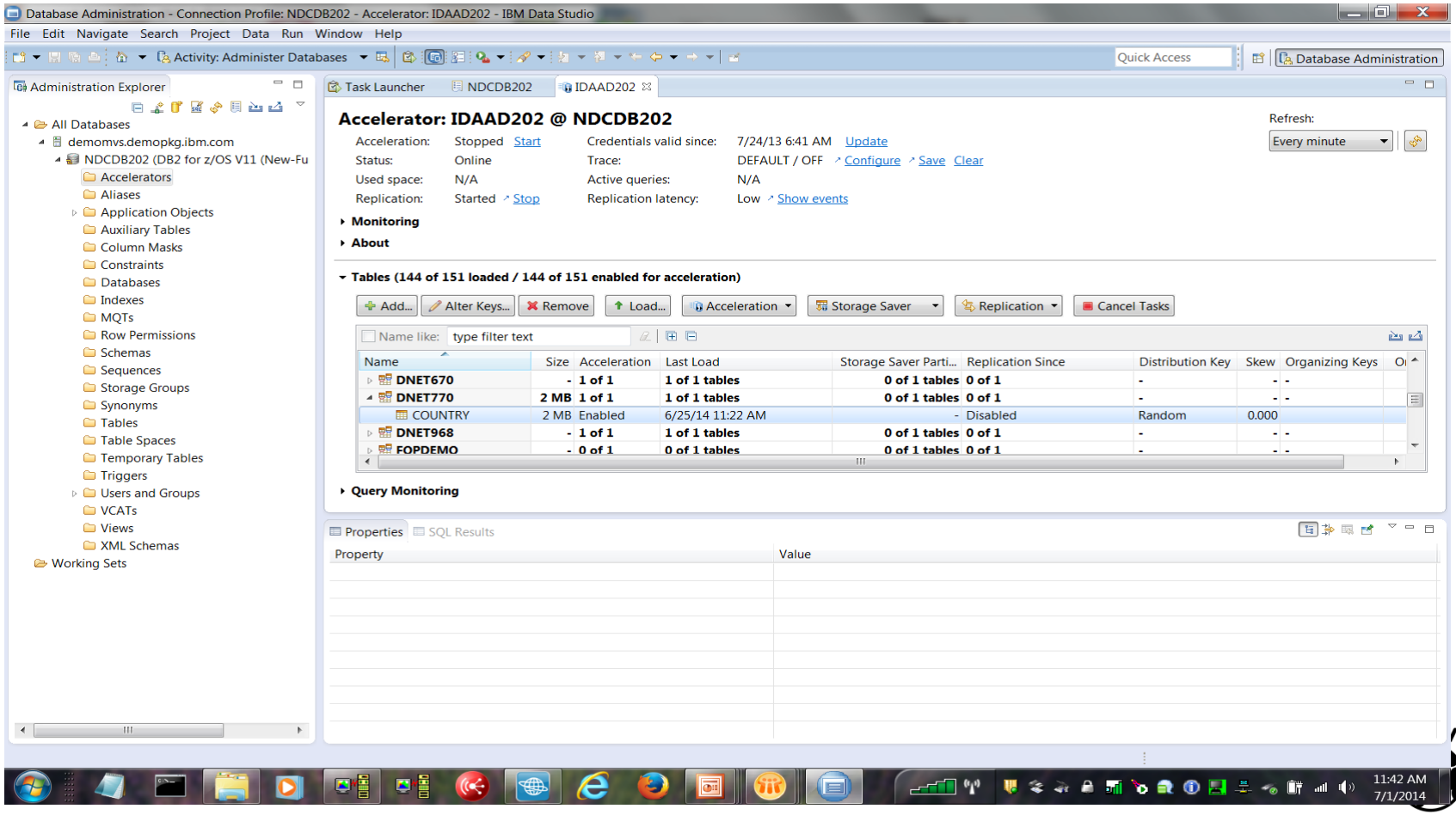
Defining IMS tables to DB2

- Executing DDL – via SPUFI for example
  - DDL can be generated using *IMS Explorer for development*

```
CREATE TABLE DNET770.COUNTRY (
GOSALES_ROOT                CHAR(12),
COUNTRY_CODE                INTEGER,
COUNTRY_EN                  CHAR(180),
SALES_REGION_CODE           INTEGER,
ISO_THREE_LETTER_CODE       CHAR(18),
ISO_TWO_LETTER_CODE         CHAR(12),
ISO_THREE_DIGIT_CODE        CHAR(18) );
```

Defining IMS tables to DB2 Analytics Accelerator

- Once defined to DB2, its easy!!
- Matter of executing ACCEL_ADD_TABLES stored procedure (can use Accelerator Studio GUI)

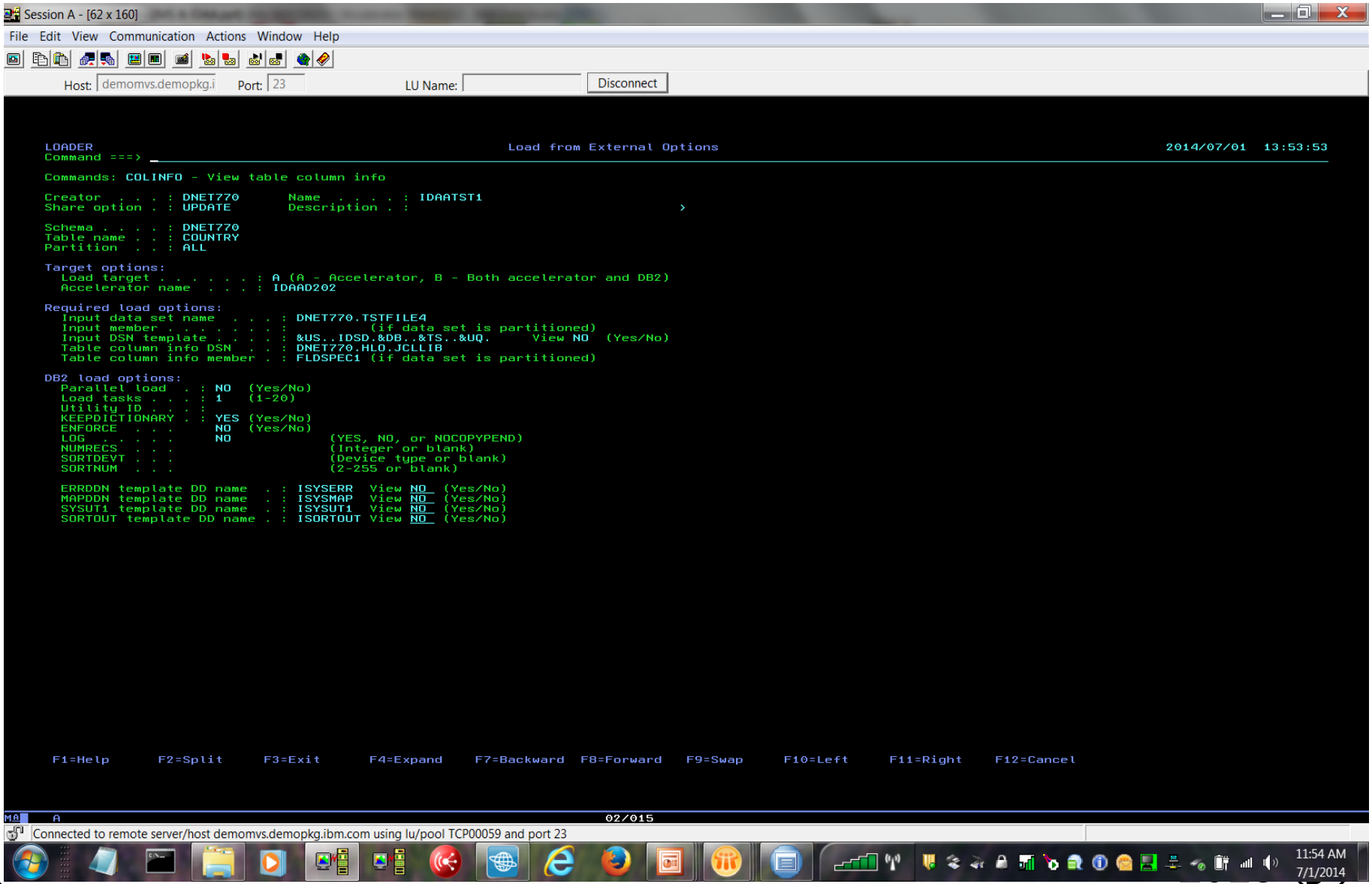


Loading IMS data into DB2 Analytics Accelerator using the DB2 Analytics Accelerator Loader for z/OS Tool

Loading IMS data into DB2 Analytics Accelerator

1. So we extracted & transformed the data using DataStage
2. We defined the IMS tables to DB2 & DB2 Analytics Accelerator
3. FTP the data over to z/OS
4. Run the DB2 Analytics Accelerator Loader for z/OS tool JCL to load IMS data into DB2 Analytics Accelerator only
   - DB2 Analytics Accelerator Loader for z/OS tool ISPF Panels can generate the JCL
   - But user still needs to code the field specifications:
     - What fields are in which columns of the input dataset

DB2 Analytics Accelerator Loader for z/OS tool ISPF Panel



DB2 Analytics Accelerator Loader for z/OS tool example JCL:

```
//HLOD0100 EXEC PGM=DSNUTILB,
//         REGION=0000M,
//         PARM=('DSNB')
//STEPLIB  DD DISP=SHR,DSN=DB2AAL.V1R1.SHLOLOAD
//         DD DISP=SHR,DSN=DB2.V11.DSNB.SDSNEXIT
//         DD DISP=SHR,DSN=DB2.V11.SDSNLOAD
//HLODUMMY DD DUMMY
//SYSPRINT DD SYSOUT=*
//UTPRINT  DD SYSOUT=*
//SYSIN    DD *
      TEMPLATE ISYSREC
        DSN 'DNET770.TSTFILE4'                          ← input dataset name
        DISP(SHR,KEEP,KEEP)
…
…
LOAD DATA
              IDAA_ONLY ON IDAAD202                     ← Accelerator
              INDDN ISYSREC
       …
              INTO TABLE
                    "DNET770"."COUNTRY"                 ← Table
                          (
                                GOSALES_ROOT POSITION ( 00001:00012) CHAR(00012),
                                COUNTRY_CODE POSITION ( 00013:00016) INTEGER,
                                COUNTRY_EN POSITION ( 00017:00196) CHAR(180),
                                SALES_REGION_CODE POSITION ( 00197:00200) INTEGER,
                                ISO_THREE_LETTER_CODE POSITION ( 00201:00218) CHAR(18),
                                ISO_TWO_LETTER_CODE POSITION ( 00219:00230) CHAR(12),
                                ISO_THREE_DIGIT_CODE POSITION ( 00231: 00248) CHAR(18)
                          )
//
```

Demo Time!!!!!

Minimum Software versions required

- IMS
  - Custom application to do the ETL: no minimum requirement
  - DataStage to do the ETL
    - Using the JDBC Interface
      - DataStage 9.1.2 & IMS V12 or higher with IMS Catalog implemented
    - Using the ODBC interface or Raw interface: no minimum IMS requirement
      - But also need Classic Federation
- DB2 V10 or higher
- DB2 Analytics Accelerator Version 3 or higher

Resources

IMS Technical Sales Resources

- White paper
  - http://ibm.biz/accelerate_insights_ims_transactional_data
- Technical Implementation document (“Cook Book”)
  - https://ibm.biz/ims_idaa_technical_implementation
- You Tube demo: https://ibm.biz/demo_ims_idaa

IMS Technical Resources …

- Kyle Charlet/Santa Teresa/IBM@IBMUS
  - STSM
  - 1-408-463-4145

- Deepak Kohli/Silicon Valley/IBM@IBMUS,
  - 1-310-393-5902

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