

Z Data Tools and APIs Overview

Mainframe Data Access Modernization Solution

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The Challenges

ZDT Overview

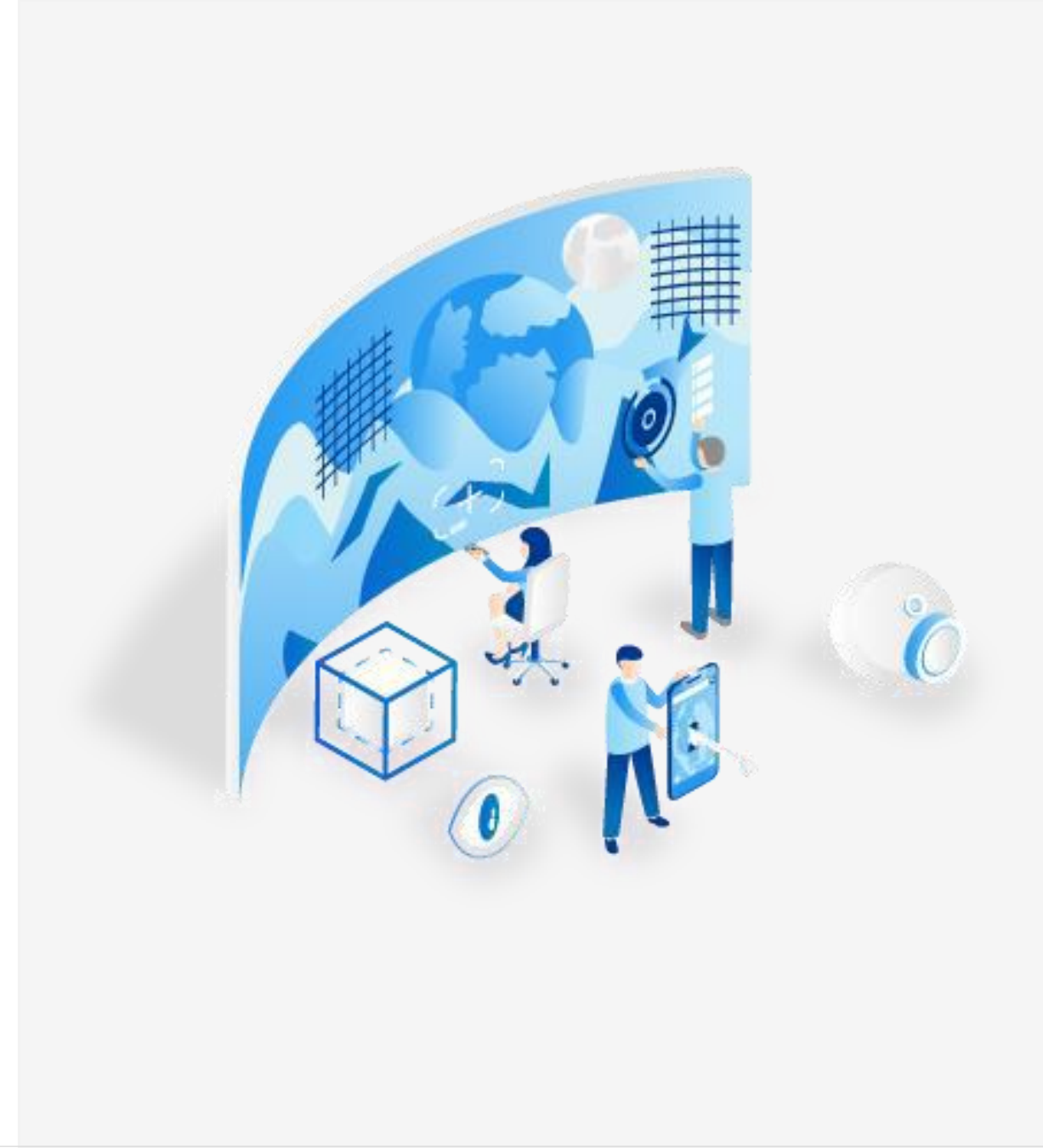
Mainframe data access modernization challenges

ZDT APIs overview

ZDT APIs use cases

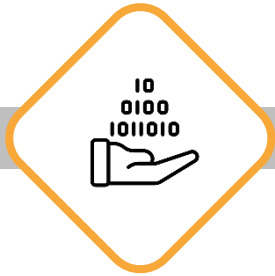
ZDT APIs capabilities and future roadmap

Summary



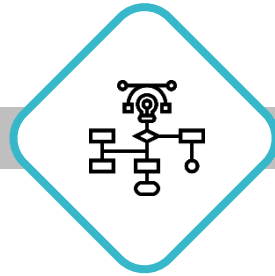
- **80%** of the world's corporate data still resides on mainframe systems today (H. Tessler, Enterprise Systems Media).
- Significant % of mainframe workloads are written in **COBOL, PL/I or Assembler** language – data layout defined in those languages.
- **Monolithic system** with decades of incremental enhancements.
- **Highly risk averse** due to mainframe workloads typically represent the most important enterprise systems (e.g. core banking systems) and cost sensitive.
- **Skills shortage** with new generation IT professionals gravitated towards new technology (e.g. REST APIs and Java).
- **Difficult to discover and integrate** existing mainframe assets with the rest of enterprise systems.

- HCL Z Data Tools (ZDT) is a set of tools that help you to manipulate data stored on z/OS systems interactively and in batch processing.
- Designed to deal with large production data efficiently while protecting integrity and privacy.
- Access to z/OS data made simple by its intuitive and consistent user interface across a wide range of data stores available on the platform.
- Access to data across multiple z/OS systems / LPARs made simple by its remote systems support.
- A must have tool for every z/OS user including system programmers, application developers, ISPF users and much more.
- Comprehensive support for a wide range of data store types:
 - *Data Sets (VSAM, QSAM, PDS, PDSE, AIM, OAM)*
 - *DB2*
 - *IMS*
 - *WebSphere MQ*
 - *CICS*
 - *Hierarchical File System under UNIX System Services*



ZDT can provide a generic data access solution without programming

- A wide range of file types are supported out of box – no programming required.
- ZDT enables manipulation of data interactively or in batch.



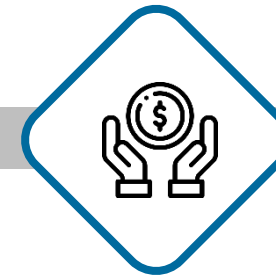
ZDT templates describe logical layout of data and allows transformation without programming

- Templates are created from COBOL, PL/I and Assembler COPYBOOKS or describe layouts in XML format.
- Describe most complex layout and data structures using the template's criteria infrastructures. For example, segmented records, nested REDEFINES and PL/I arrays.
- Change column orders and hide columns based on your requirements.
- Specify criteria to select a subset of data you are interested to work with.



ZDT template repository for retaining mainframe knowledge for the future

- Template repository contains a list of mapping between data source and matching template to use.
- This enables new users to start working with your mainframe data quicker.
- Once the repository is setup by expert, ZDT leverages the information during its operation to simplifies tasks for end users all around.



ZDT saves cost by powerful set of tools

- ZDT provides a powerful set of batch functions such as copy, compare, edit, export, load, print and much more.
- ZDT's remote systems support enables access to data on remote systems as well while hiding much of mainframe specific complexity.
- Replace in-house apps with powerful ZDT functions for improved efficiency & ease of maintenance.

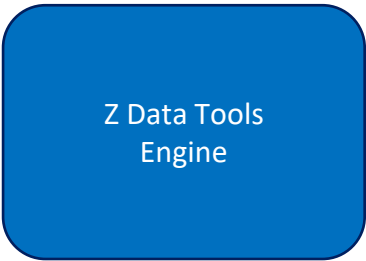
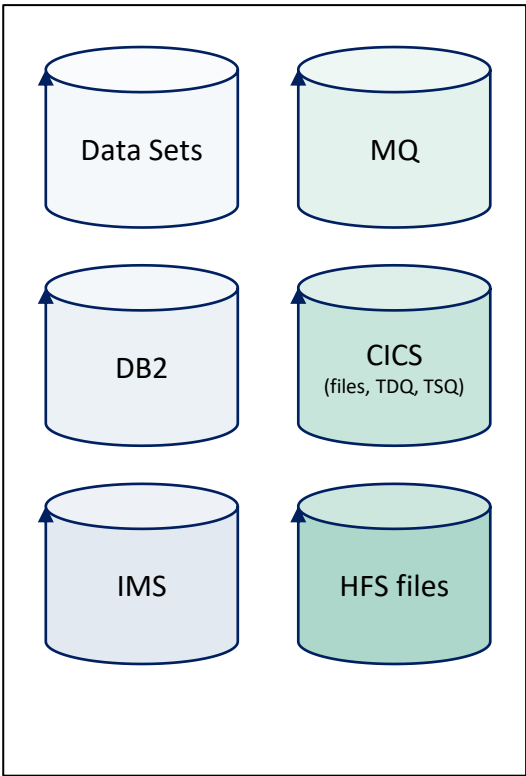


ISPF user friendly productivity improvement features

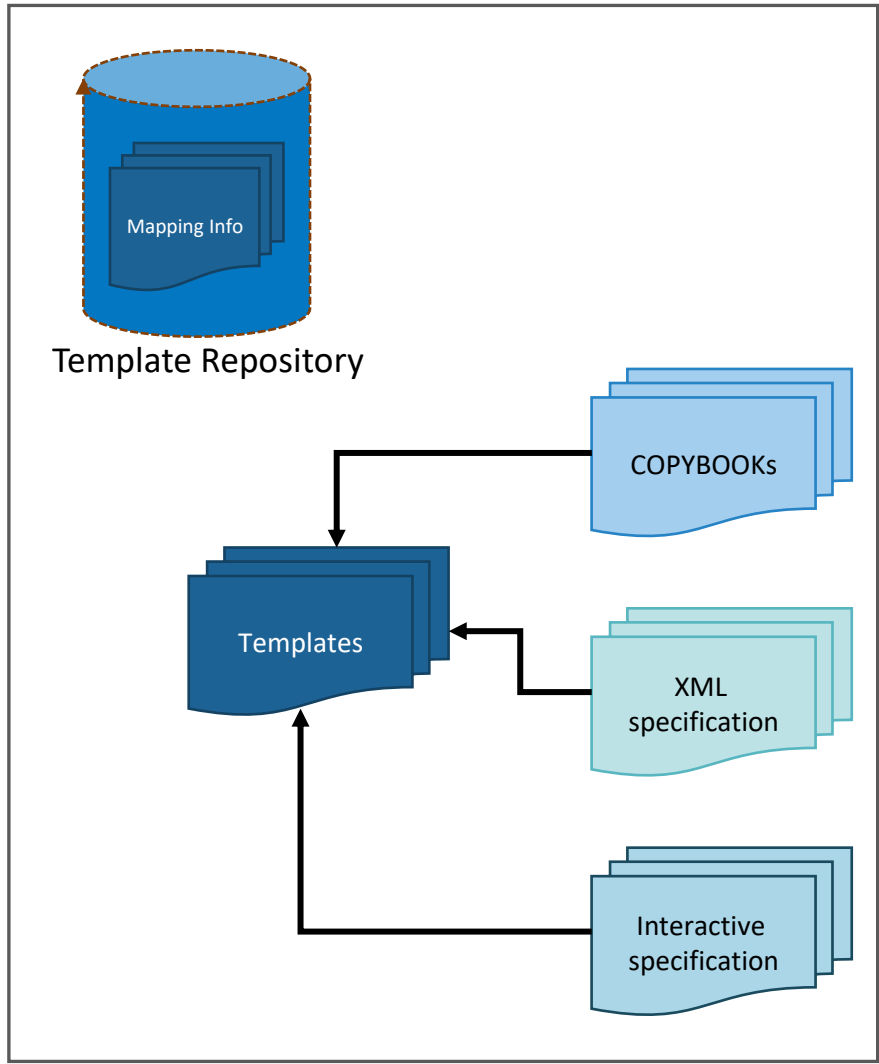
- Specify a group of resources to work with on a local system as well as remote systems.
- Search text and change across the specified group of resources with powerful navigation panel display.
- Clone the specified group of resources to create backup.
- Edit JCL with ease.

How does it work?

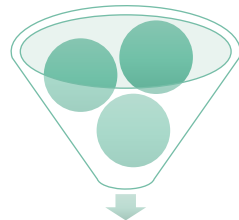
Data to be processed



Logical Layout of Data



Interactive processing



Batch processing

Java™ on Mainframe



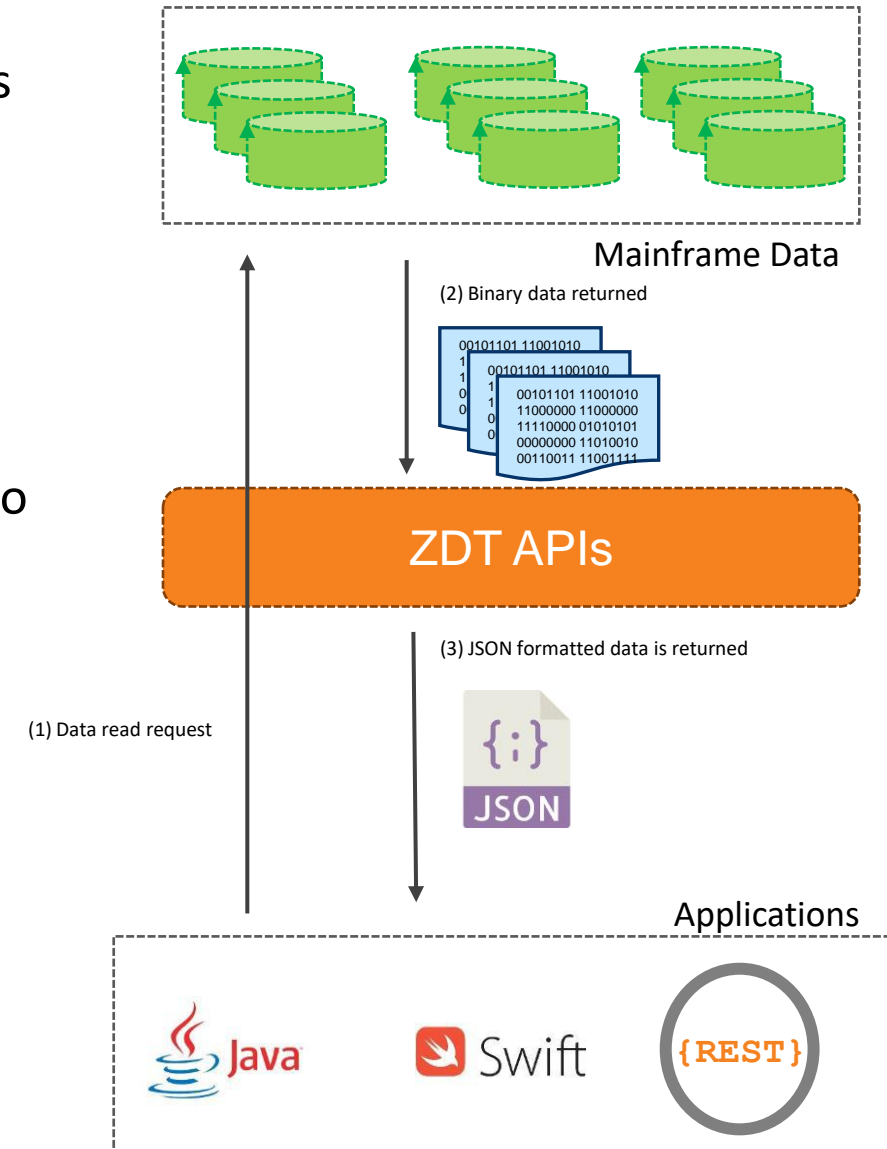
- ▶ On z/OS® since 2000.
- ▶ IBM® z14 [announcement](#): performance improvement by exploiting new hardware.
- ▶ CICS® TS V5.4 [announcement](#): *Support for applications written to the Java™ EE 7 full platform specification.*
- ▶ IMS™ 15 [announcement](#): *More expansive and dynamic Java development experience.*
- ▶ Offload MIPS to IBM z Integrated information Processor (zIIP) engine.

Challenges

- ▶ Most data stored on the platform are defined by COBOL, PL/I and Assembler programs.
- ▶ Mainframe data structures typically do NOT map directly to Java and other modern languages.
- ▶ Steep learning curve for non-mainframe developers to understand the structure and manipulate mainframe data.
- ▶ New languages on the platform.



- ▶ HCL Z Data Tools APIs (ZDT APIs) is an add-on product which provides Java™ and Swift application programming interfaces (APIs) to manipulate mainframe data.
- ▶ APIs leverages ZDT's template infrastructure to understand logical layout of mainframe binary data .
- ▶ Mainframe binary data is converted into JSON format and returned to API consumers in Java or Swift for easier interpretation and manipulation for developers with no mainframe background.
- ▶ Usage scenario includes but not limited to:
 - Replacement of legacy applications for batch processing of data in Java.
 - Integration of traditional mainframe apps with new apps.
 - Interpretation of mainframe operational data for analytics (eg. SMF data).
 - Manipulation of mainframe data in virtual storage.



Application Modernization

- Develop new applications in Java™ and Swift Programming language
- Build new business logic with JSON & RESTful API's.

Replacement of legacy applications for batch processing of data in Java

- MIPS reduction (offload to speciality engines zIIP/ IFL's)
- ZDT backend allows for processing of 'always online' CICS resources

Integration of traditional mainframe apps with new apps and data stores

- Traditional mainframe data sources enabled via ZDT API for new or extended use cases, including reflecting data to other data platforms.

IT Operation Analytics

- Interpretation of mainframe operational data for analytics (e.g SMF data).

Manipulation of mainframe data in virtual storage

- For unusual resource types or manipulations

COBOL COPYBOOK

```
01 REC-TYPE01.  
  03 REC-TYPE                PIC XX.  
  03 REC-ID REDEFINES REC-TYPE PIC XX.  
  03 NAME                     PIC X(20).  
  03 EMPLOYEE-NO             PIC 9(4) BINARY.  
  03 AGE                      PIC 9(4) BINARY.  
  03 SALARY                   PIC 9(7) PACKED-DECIMAL.  
  03 MONTH PIC 9(8) BINARY OCCURS 12 TIMES.  
  03 FILLER                   PIC XX.
```

JSON produced:

```
{  
  "layouts": [  
    {  
      "REC-TYPE01": {  
        "REC-TYPE": "01",  
        "NAME": "Andrew Apple",  
        "EMPLOYEE-NO": 6645,  
        "AGE": 53,  
        "SALARY": 78500,  
        "MONTH": [  
          30,  
          22,  
          46  
          ...  
        ],  
        "FILLER": "\u0000\u0000"  
      }  
    }  
  ]  
}
```

- 1 Powerful set of tools to manipulate mainframe data interactively and in batch
- 2 Powerful framework to represent logical layout of mainframe data (templates)
- 3 Knowledge retention of your mainframe data through usage of ZDT template repository – all ZDT function leverages the repository to simplify usage even for new users
- 4 Productivity improvement features for ISPF users
- 5 Mainframe data access modernization using ZDT APIs in Java™ and Swift languages as well as REST APIs – simplifies application development especially for developers with limited mainframe experiences
- 6 Continued enhancement to meet mainframe data manipulation requirements today and future

HCL

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