Advancements in IMS Application Development: Testing your IMS Application

Session Number 1368

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Information On Demand **2011**

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IMS Simplification

Reduce skills, time and cost required to
manage IMS systems and to develop IMS applications

✓ Using industry standards

✓ Consistent look and feel

✓ **Integration**

IMS Application Development Cycle
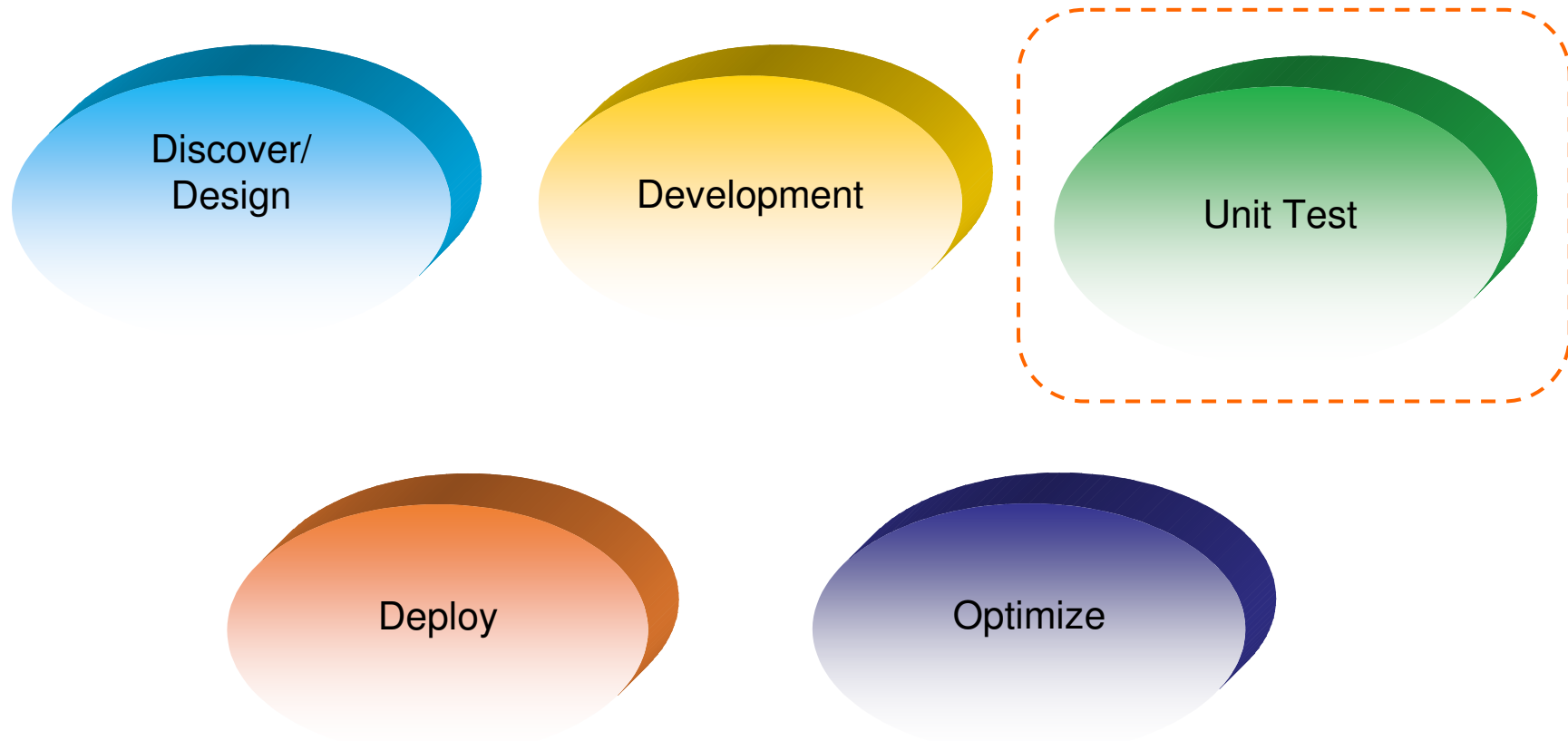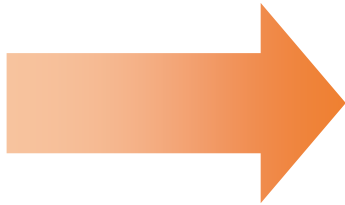
Discover/ Design

Development

Unit Test

Deploy

Optimize

Testing an IMS Application

Problem - High development and maintenance costs
Easier to access development and test systems
Hard to access systems in a timely manner
Make more cycles available for production use
Reduce complexity of setting testing systems

Rational Developer for z Unit Test

Problem – How to define a test bed with meaningful and secure data ?
Test data that simulates real data
Cloning production databases is inefficient (too much data, time consuming)
Cloning does not address sensitive data

Optim Test Data Manager Solution for z/OS

Mainframe development environment with RDz and ISPF

RDz provides relief…but customers want more

RDz user

RDz user

ISPF user

RDz user

ISPF user

ISPF user

Modern IDEs add value:
- Productivity enhancing tooling; more attractive tooling for new developers
- Ability to offload some development MIPS usage
- Integration with complete application lifecycle tools

But challenges remain:
- Business pressures to manage mainframe MIPS usage for development
- Unit test delays caused by dependencies on operations team

Rational Developer for System z
Eclipse-based tools to develop and maintain enterprise applications spanning multiple platforms and languages
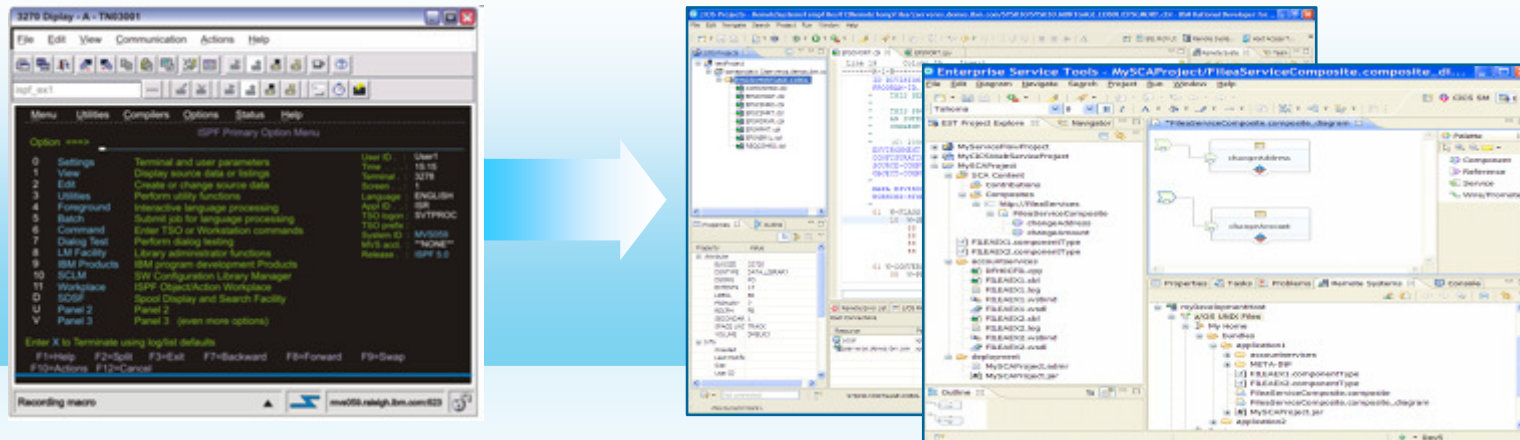
✓ 50%-80%[1] reduction in host CPU usage with workstation syntax checking

✓ 15% or more improvement in developer productivity[1]

✓ Tools with which to attract new talent

- Rational Developer for System z

"RDz offers a uniform, open programming environment for both J2EE and PL/I developers. RDz accelerates PL/I development with its local syntax checker and debugging tool."

- Dr. Axel Lömker, KfW Bankengruppe

[1] Aggregation of results from a productivity study conducted by IBM System z customers

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NEW RDz Unit Test Feature

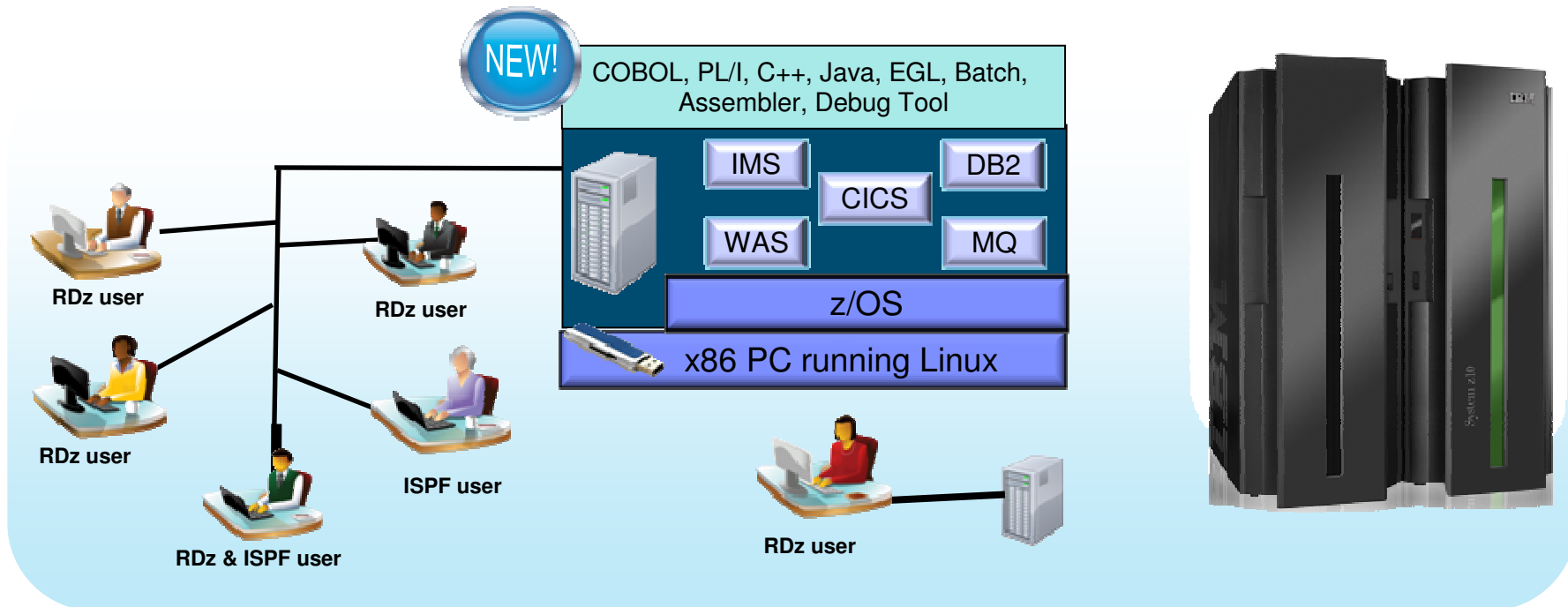***The ultimate in modern application development for System z***

NEW!

COBOL, PL/I, C++, Java, EGL, Batch, Assembler, Debug Tool

IMS | CICS | DB2
WAS | | MQ

z/OS

x86 PC running Linux

RDz user

RDz user

RDz user

ISPF user

RDz & ISPF user

RDz user

- ▪ Liberate developers to rapidly prototype new applications
- ▪ Develop and test System z applications anywhere, anytime!
- ▪ Free up mainframe development MIPS for production capacity
- ▪ Eliminate costly delays by reducing dependencies on operations staff

Note: This Program is licensed only for development and test of applications that run on IBM z/OS. The Program may not be used to run production workloads of any kind, nor more robust development workloads including without limitation production module builds, pre-production testing, stress testing, or performance testing.

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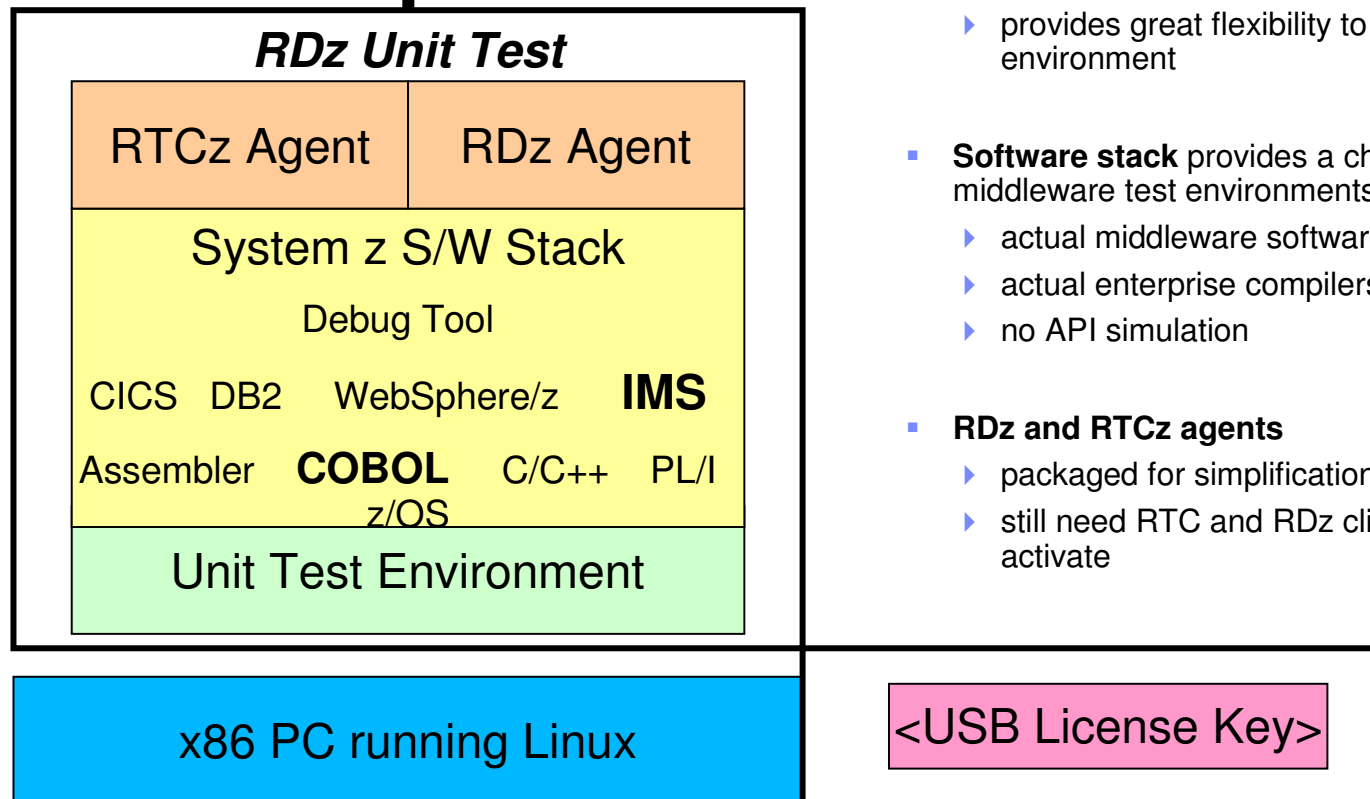# RDz Unit Test Offering Description
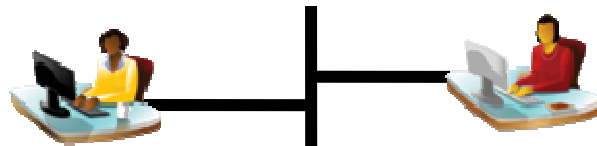
The RDz Unit Test Feature consists of:

- **Unit Test Environment (based on zPDT)**
  - Unit Test Environment can provide a System z development platform on a PC
  - capable of running z/OS
  - provides great flexibility to run a customized environment

- **Software stack** provides a choice of IBM middleware test environments
  - actual middleware software (including z/OS)
  - actual enterprise compilers
  - no API simulation

- **RDz and RTCz agents**
  - packaged for simplification
  - still need RTC and RDz client license(s) to activate

RDz Unit Test

RTCz Agent	RDz Agent

System z S/W Stack

Debug Tool

CICS   DB2   WebSphere/z   **IMS**

Assembler   **COBOL**   C/C++   PL/I
z/OS

Unit Test Environment

x86 PC running Linux

<USB License Key>

RDz UT Usage Scenarios – Common threads

- Where do builds take place?
  - ▶ Compilations can be done in RDz UT or the mainframe
  - ▶ Production builds should always take place on mainframe

- Where does source code reside?
  - ▶ This is a major design point.
    - Moving data can be manual, semi-automated or fully distributed.

- How does one move source or data from/to RDz UT?
  - ▶ Move data from/to RDz UT much like you would to an LPAR
    - RDz drag and drop, FTP, sftp, XMIT, NFS, DFS, etc
    - Non-VSAM files need format conversion before & after transfer
    - RDz UT provides facilities for transferring whole disks to RDz UT

RDz UT based build

- **Development on RDz UT with host-based SCM:**

  - Copy code and data to RDz UT as needed

  - Use RDz or other methods to run a standard compile/debug cycle

  - When tests and changes are complete, merge changes back to mainframe
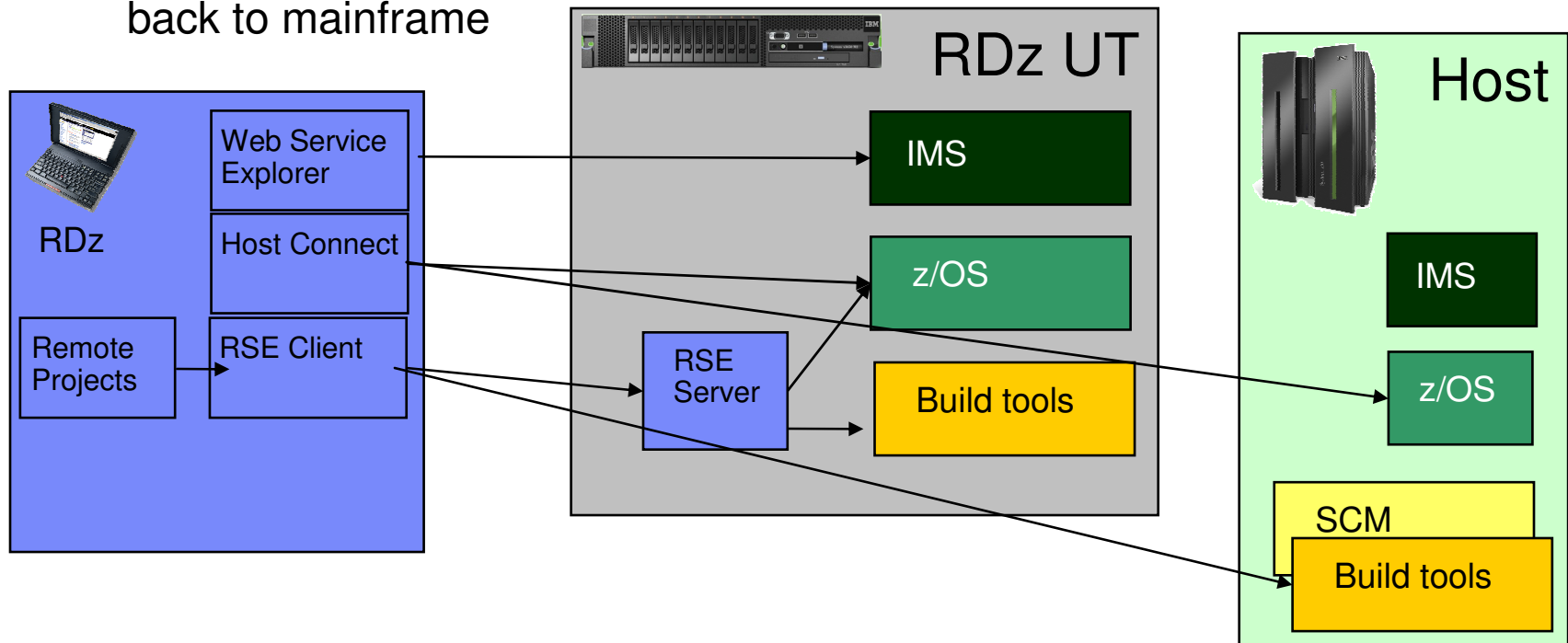
Testing an IMS Application

Problem - High development and maintenance costs
Easier to access development and test systems
Hard to access systems in a timely manner
Make more cycles available for production use
Reduce complexity of setting testing systems

Rational Developer for z Unit Test

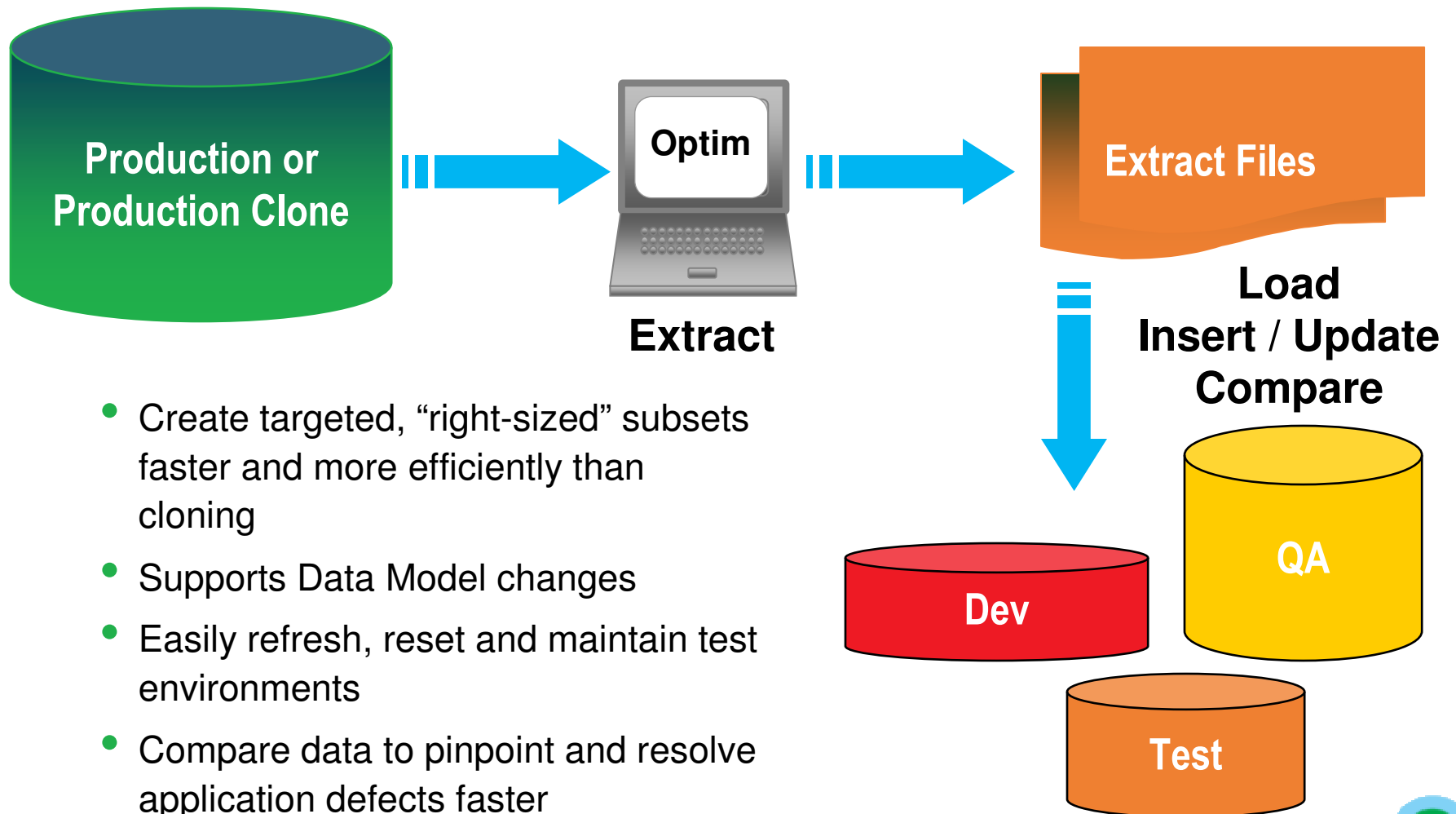**Problem – How to define a test bed with meaningful and secure data ?**
Test data that simulates real data
Cloning production databases is inefficient (too much data, time consuming)
Cloning does not address sensitive data

Optim Test Data Manager Solution for z/OS

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Optim™ Test Data Management for z/OS

Production or Production Clone → **Optim** (Extract) → **Extract Files** → **Load Insert / Update Compare**

Dev, QA, Test

- Create targeted, "right-sized" subsets faster and more efficiently than cloning

- Supports Data Model changes

- Easily refresh, reset and maintain test environments

- Compare data to pinpoint and resolve application defects faster

- Accelerate release schedule

Optim™ Test Data Management: Best Practices

TDM refers to the need to manage data used in testing and other non-production environments

- Extract related subsets of production data that are targeted to functionality under test
- De-identify / mask related test data to protect privacy
- Quickly and easily refresh test environments
- Edit data to create error and boundary conditions
- Compare "before" and "after" images of test data

Benefits: **Improving application quality & customer satisfaction**
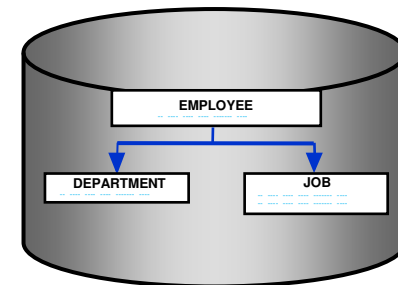
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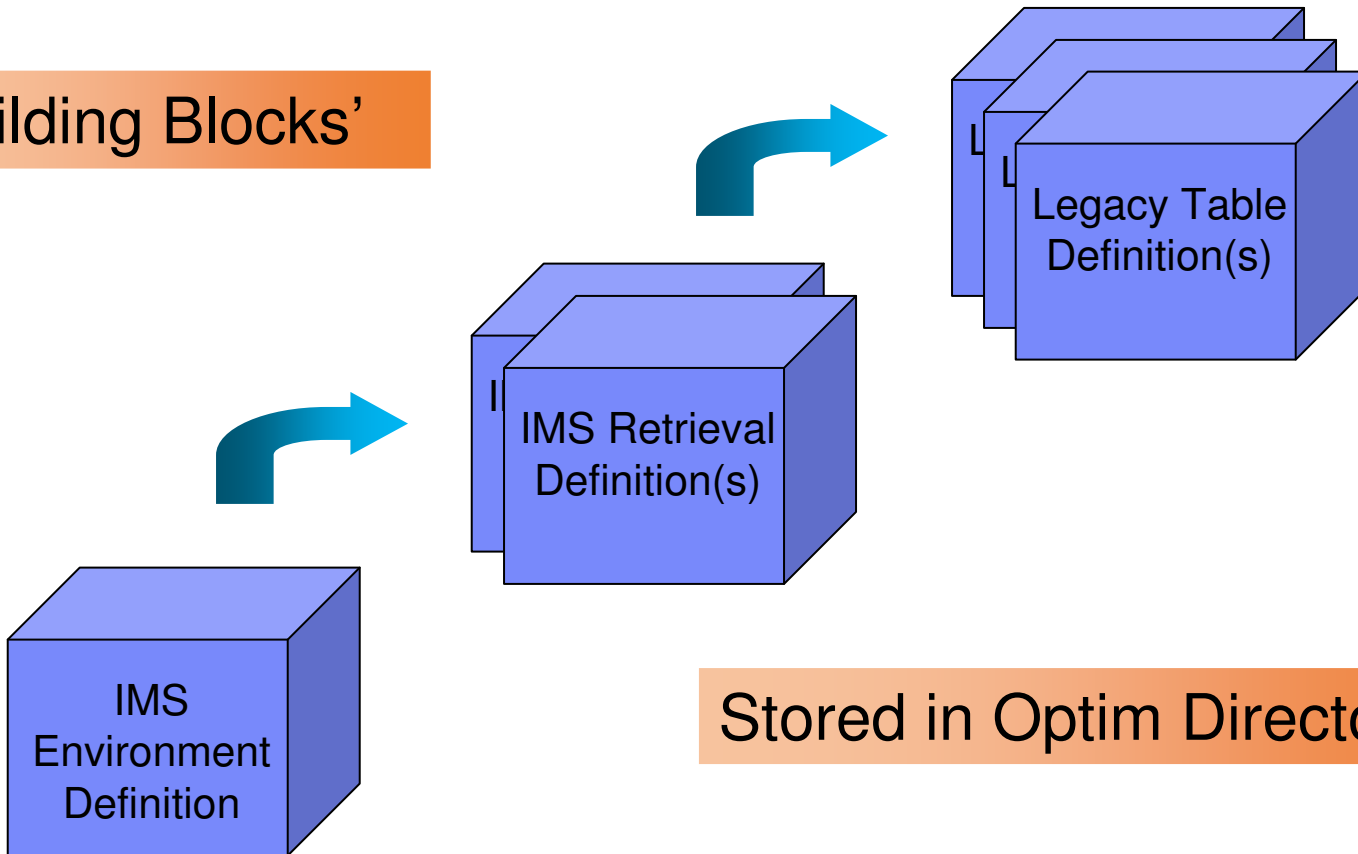
What Is IMS Data to Optim?

- IMS = Hierarchical Database

  – Database consists of segments

  – Segments are related (physically)

- Optim uses a relational model of tables, rows and columns

- Optim Distributed uses Middleware to access IMS. More tied to relational model.

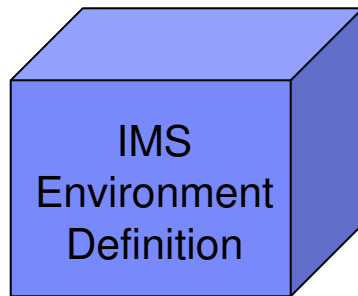- Optim z/OS uses native (DL/I) access to IMS data.

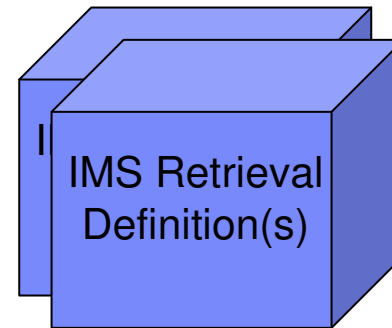# Overview of Optim z IMS Definitions

'Building Blocks'

IMS Retrieval Definition(s)

Legacy Table Definition(s)

IMS Environment Definition

Stored in Optim Directory

Optim z IMS Definitions: Environment Definition

IMS Environment Definition

- One for each IMS environment to be accessed by Optim

- Identifies the IMS Load Libraries, the IMS DBD and PSB Libraries, and the location of the data, online or offline to IMS

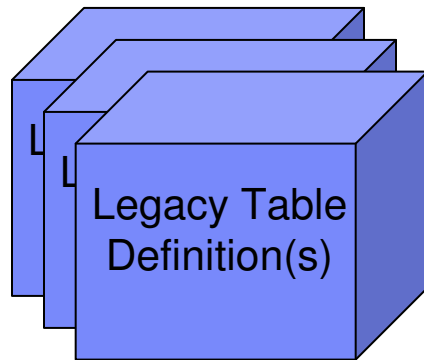- Allows Optim to access IMS data through the proper libraries

IMS Retrieval Definition(s)

- Provides defaults for processing IMS data

- Associates an Optim Environment Definition with an IMS DBD

- Specifies DBD information such as the PSB name, PCB number, DD name, and the IMS dataset name
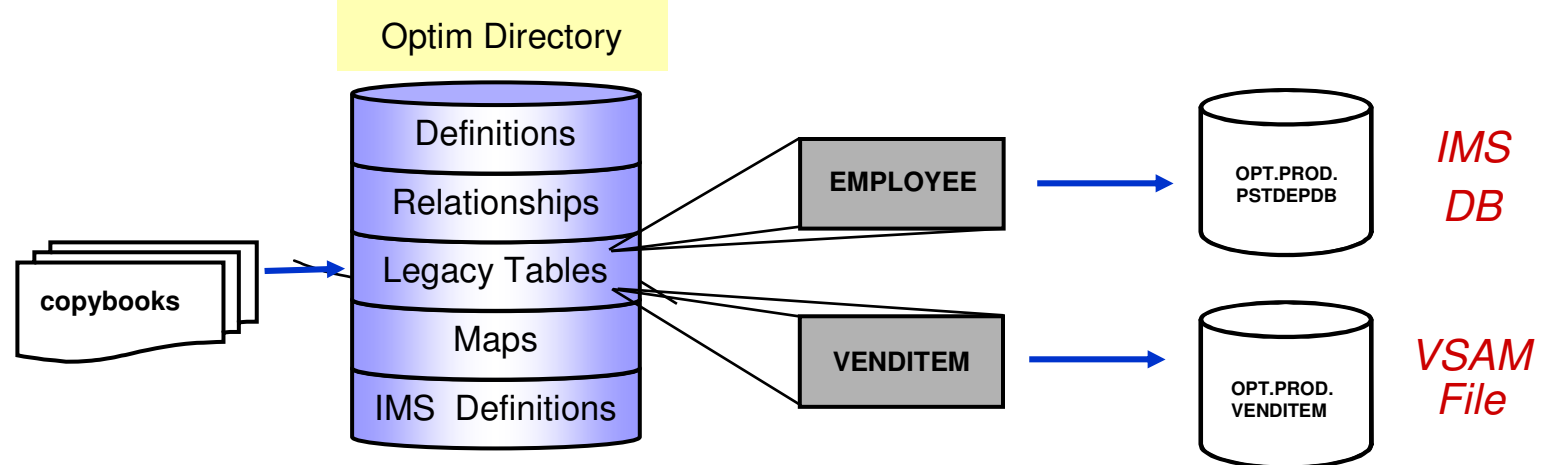
Optim z IMS Definitions: Legacy Table Definitions

Legacy Table Definition(s)

- Describes physical layout of segment
- Create from COBOL or PL/1 copybook
  - Associated with IMS segment
  - Definition stored in the Optim Directory
- Relate to other tables (DB2 or Legacy) via Optim Relationship
- Segment treated as virtual DB2 table by any Optim process

Optim Directory

| Definitions |
| Relationships |
| Legacy Tables |
| Maps |
| IMS Definitions |

copybooks

EMPLOYEE → OPT.PROD. PSTDEPDB → *IMS DB*

VENDITEM → OPT.PROD. VENDITEM → *VSAM File*

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Create/maintain Optim z definitions

```
--------------------------- IBM's Optim     --------------------
OPTION ===> 6            <===

0  OPTIONS          - Site and User Options     SQLID  ===> userid
1  BROWSE TABLE     - Browse a DB2 Table        SUBSYS ===> DD8F
2  EDIT TABLE       - Edit a DB2 Table
3  BROWSE USING AD  - Browse DB2 Tables Using Access Definition
4  EDIT USING AD    - Edit DB2 Tables Using Access Definition
5  ADS              - Create or Modify Access Definitions
6  DEFINITIONS      - Maintain Optim Definitions (Keys, Maps, ...)
7  MIGRATION        - Data Migration - Extract, Insert, Update, ...
8  COMPARE          - Compare Two Sets of Data
9  ARCHIVE          - Archive and Restore Data

T  TUTORIAL
C  CHANGES
X  EXIT
P  LICENSING
```

```
-------------------- Choose a Definition Option ----------------
OPTION ===> 7            <===
                                              SQLID  ===> userid
 1  PRIMARY KEYS     - Maintain Primary Keys   SUBSYS ===> DD8F
 2  RELATIONSHIPS    - Maintain Relationships
 3  COLUMN MAPS      - Maintain Column Maps
 4  TABLE MAPS       - Maintain Table Maps
 5  ADS              - Maintain Access Definitions
 6  LEGACY TABLES    - Maintain Legacy Tables for Non-DB2 Data
 7  IMS ENVIRONMENT  - Maintain IMS Environment Definitions
 8  IMS RETRIEVAL    - Maintain IMS Retrieval Definitions

 E  EXPORT           - Export Optim Object Definitions
 I  IMPORT           - Import Optim Object Definitions
```
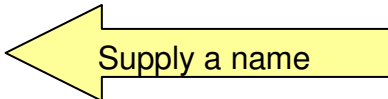
```
 5655-V29 (C)
 All rights res
 US Government
 restricted by
```

Creating an IMS Environment Definition

```
------------------------ Choose an IMS Environment ----------------------
Command ===>

                                                     SUBSYS: DSNA

IMS Environment:
  Environment Name ===> PSTLSP

Use '_' for DB2 LIKE character ===> NO     Y-Yes, N-No
```

Supply a name

```
--------------------- Define IMS Environment PSTLSP ---------------------
----
 Command ===>                                           Scroll ===>
PAGE
                                                     SUBSYS:
DSNA
 IMS Program Libraries     ===> 'IMS.DEMO.RESLIB'
                           ===>
                           ===>


 IMS DBD and PSB Libraries ===> 'IMS.DEMO.DBDLIB'
                           ===> 'IMS.DEMO.PSBLIB'
                           ===>
                           ===>


 DFSVSAMP DSN/Member Name  ===> 'IMS.DEMO.PROCLIB(DFSVSM00)'

 If data is online to IMS, enter the IMS System ID ===>     AGN ===>
```

Application Group Name

Creating an IMS Retrieval Definition

```
-------------------- Choose a Definition Option --------------------
OPTION  ===> 8  <===

                                        SQLID   ===> PSTLSP
1   PRIMARY KEYS      - Maintain Primary Keys     SUBSYS ===> DSNA
2   RELATIONSHIPS     - Maintain Relationships
3   COLUMN MAPS       - Maintain Column Maps
4   TABLE MAPS        - Maintain Table Maps
5   ADS               - Maintain Access Definitions
6   LEGACY TABLES     - Maintain Legacy Tables for Non-DB2 Data
7   IMS ENVIRONMENT   - Maintain IMS Environment Definitions
8   IMS RETRIEVAL     - Maintain IMS Retrieval Definitions  <===

E   EXPORT            - Expo
I   IMPORT            - Impo
```

```
-------------------- Choose an IMS Retrieval Definition -------------------
Command ===>
                                                    SUBSYS: DSNA


IMS Retrieval Definition:

   Environment Name ===> PSTLSP

   IMS DBD Name       ===> PSTDEPDB  <===



Use '_' for DB2 LIKE character ===> NO     Y-Yes, N-No
```

The Retrieval Definition connects the IMS database to   be accessed with the appropriate IMS environment

Specifying the IMS DBD: 'Legacy IMS Tables'

Extracting Data: Multiple uses for the same Extract

Masking the data

Recent Optim IMS and Legacy Support enhancements

- Support multiple record layouts for an IMS segment

- Batch Legacy Table definition utility

- Date/Time/Timestamp data types in Legacy Table Defs

- IMS Compression Exit

- IMS Sequential Dependent (SDEP) Segment Support

- Improvements in unkeyed segment support (over time)

- Working on: Legacy Compare

- Working on: Support for data transformation in Legacy Table arrays.
  First: fixed arrays. Later: variable length arrays.

- Working on: Relationship exits