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DB2 Server for VSE & VM 7.5
New Functions and Connectivity

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Agenda

Section 1

New Features in DB2 Server for VSE & VM Version 7.5

Section 2

Connectivity from DB2 VM/VSE client to other DB2 LUW servers

Agenda

Section 1

New Features in DB2 Server for VSE & VM Version 7.5

- DB2 Server
- DB2 Server Client Edition
- Future Trends

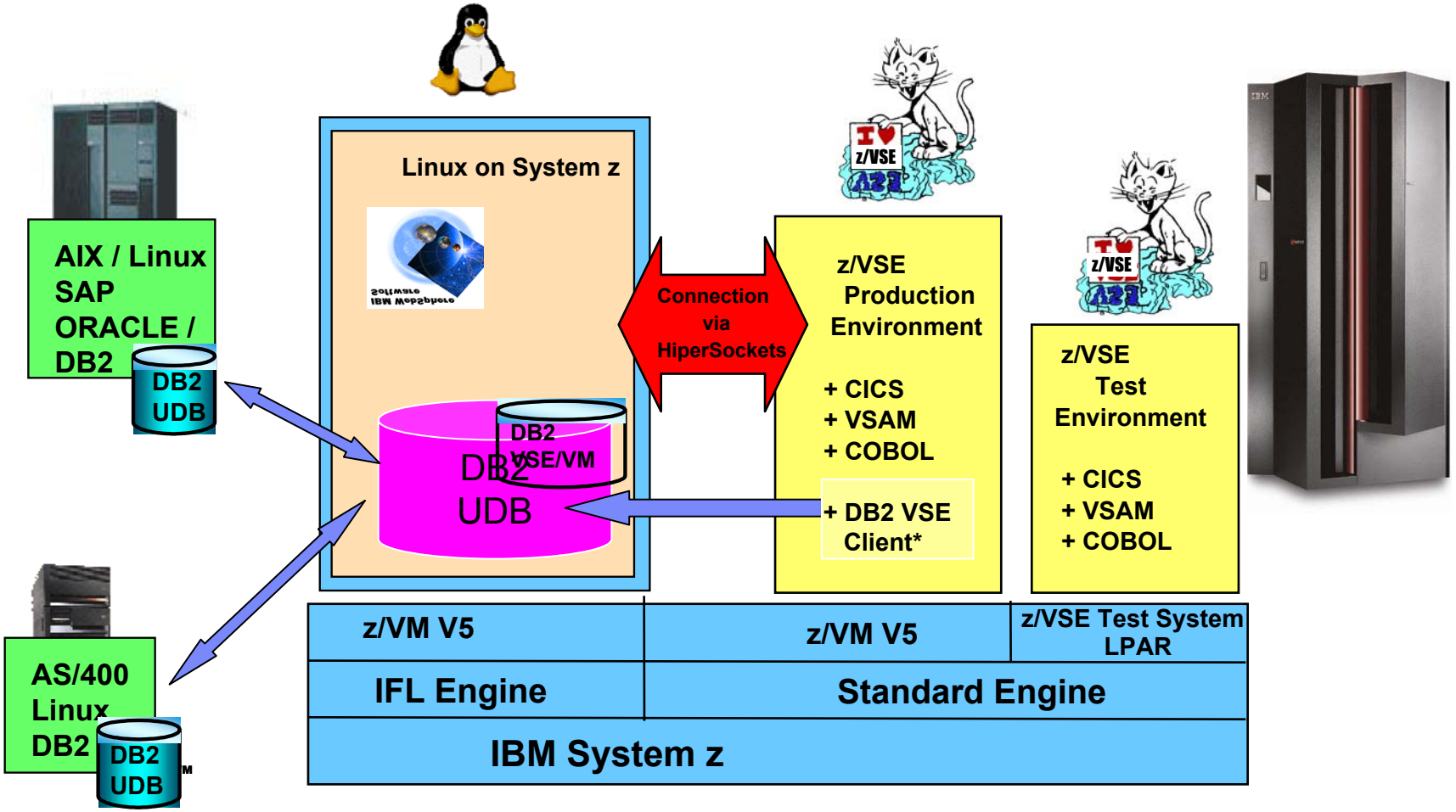
New features and enhancements in Version 7.5

- DB2 Client Edition (CE) on VSE and VM
- Improved Checkpoint Performance (server)
- Application Message Formatter (DRDA messages)
- Bind File support for Batch in VSE and VM
- New EZASMI TCP/IP Interface
  - std. TCP/IP interface from IBM for applications -z/OS compatible
  - in addition to existing LE/C interface and Assembler/CSI interface

New enhancements in Version 7.5(contd.)

- DRDA Performance Enhancements
- Making Online Resource Adapter run above the line
- Communication Performance Enhancements
- Multirow or Buffered Insert
- Connection Pooling
- Batch Implicit connect (PK61360 / UK34936)

DB2 Scenarios – with DB2 UDB on Linux



(*) DB2 VSE Client – the client functionality only, can be obtained with DB2 for VSE & VM 7.5 Client Edition

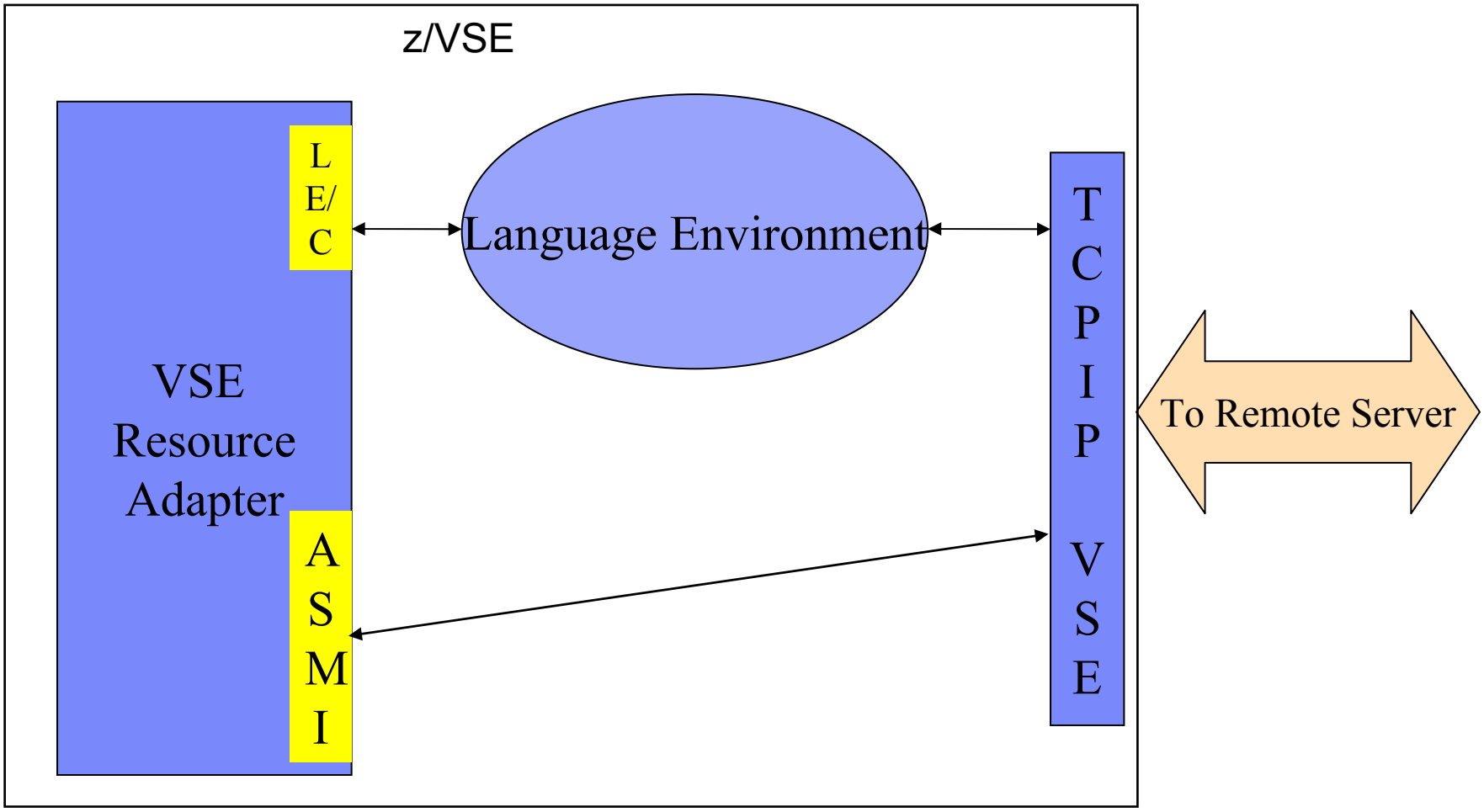
DRDA Performance Enhancements

Business value for this feature:

- Faster turn around time, through
  - better buffering logic for Resource adapter runtime data
  - Enhanced DRDA message parsing logic that reduce CPU through better process elimination techniques
  - Increasing resident properties of frequently accessed routines
- Reduction of communication wait time at the server by reducing client processing time and faster turn around time to submit subsequent request to the server.

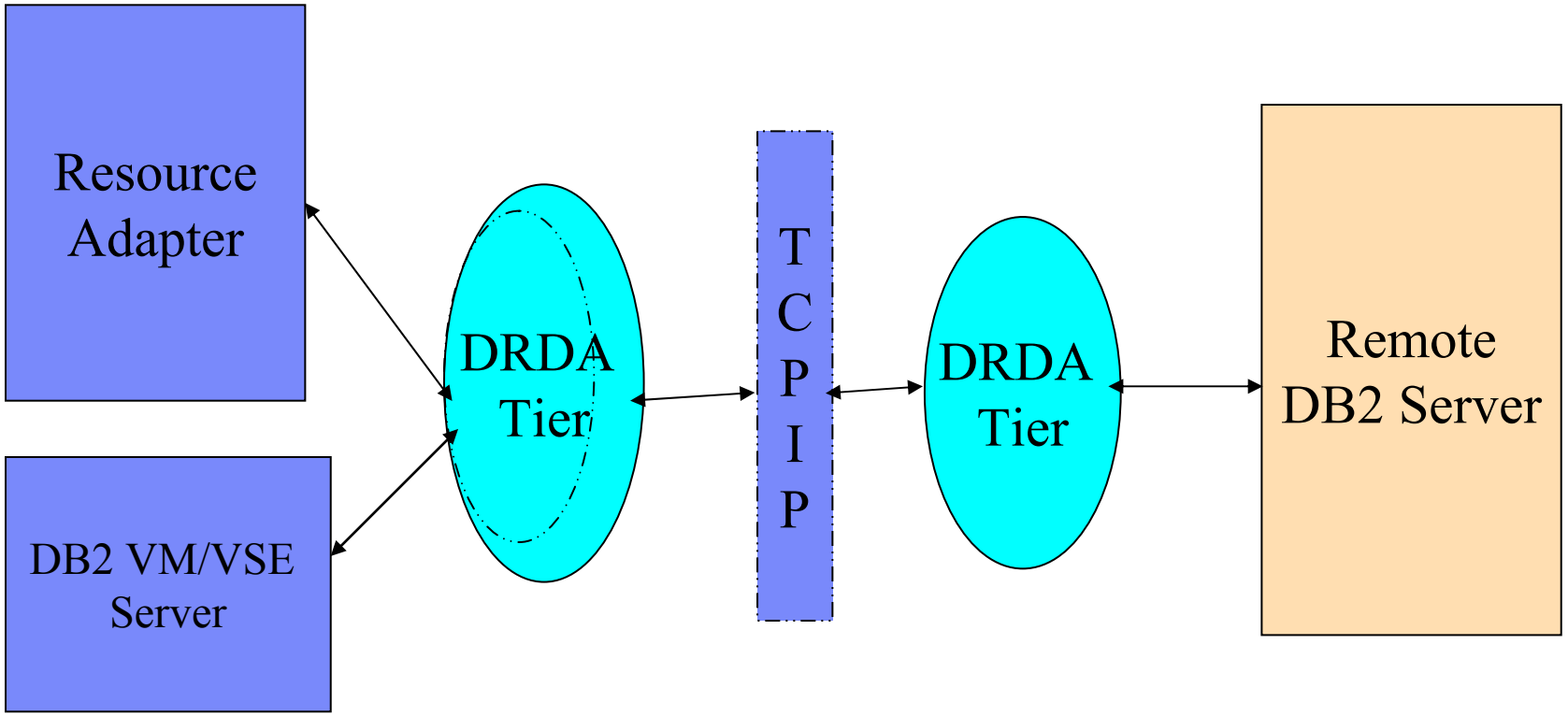
Communication Performance Enhancements

1. Enhanced communication via TCPIP CSI Assembler Interface



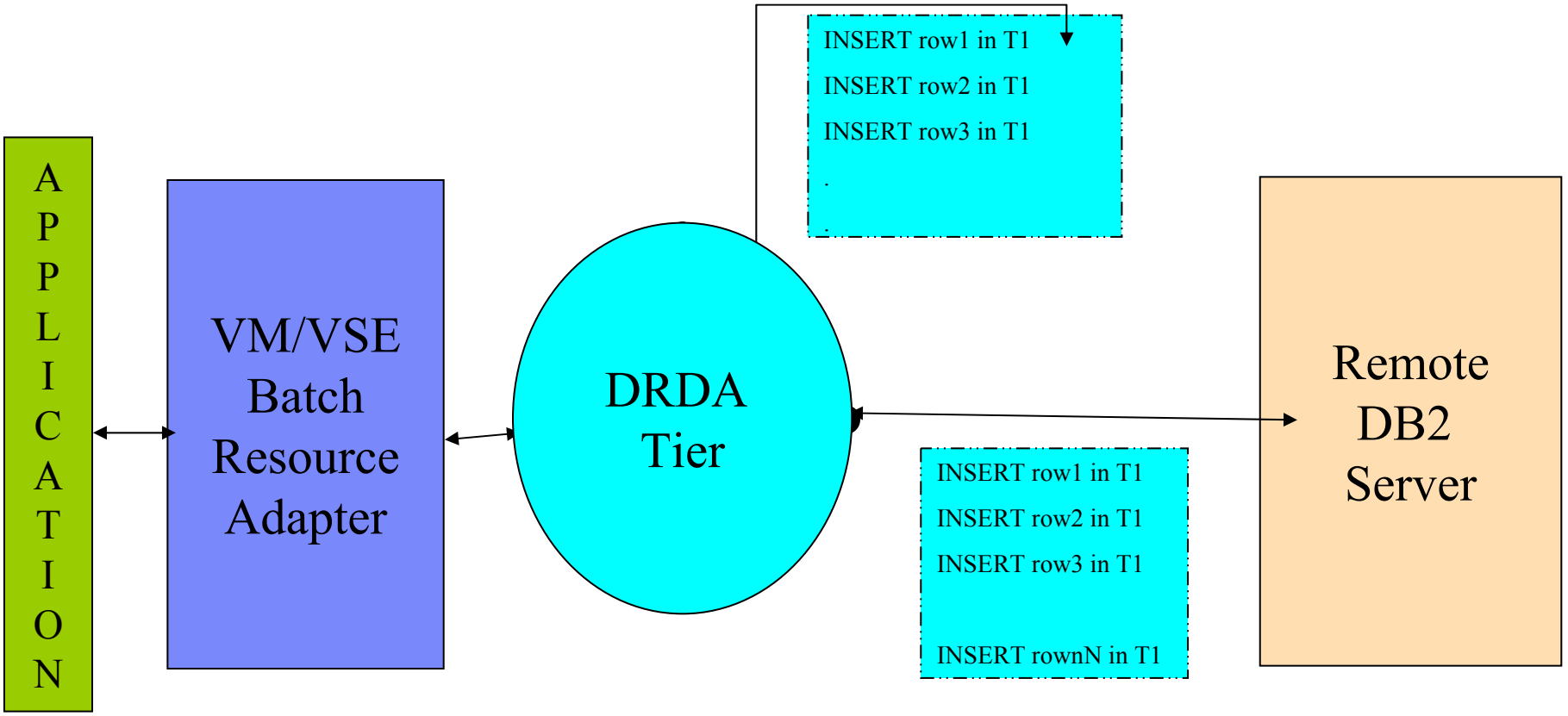
Communication Performance Enhancements (contd..)

2. Code Path Length Reduction



- Tests under controlled environments showed 10 % performance improvement

Multirow Insert or Buffered Insert over DRDA



Multirow Insert or Buffered Insert over DRDA

Limitations and Considerations:

- Heterogeneous INSERTs or non-INSERT SQLs between homo-genous INSERTs cannot benefit from this feature. (Inserts have to be all in the same table – merged inserts will be created)
- Number of INSERTs or PUTs that can be buffered is limited to a maximum limit of 32K. But this is a lot
- AUTOCOMMIT is disabled for buffered insert (COMMIT has to be done explicitly or via COMMITCOUNT)

Recommendations:

For high speed mass data movement

Multi row Insert Target Users

- *VSE Batch applications over DRDA via TCP/IP*
- *VM Applications over DRDA via TCP/IP*
- *Database Service Utility (DBSU) DATALOAD facility*
- *NOT usable for Online users applications* including *ISQL* running on
- *NOT usable for ISQL application on VSE and VM*

Multirow Insert or Buffered Insert over DRDA

Benefits of this feature:

-DBSU DATALOAD performance improved **10 times !!**

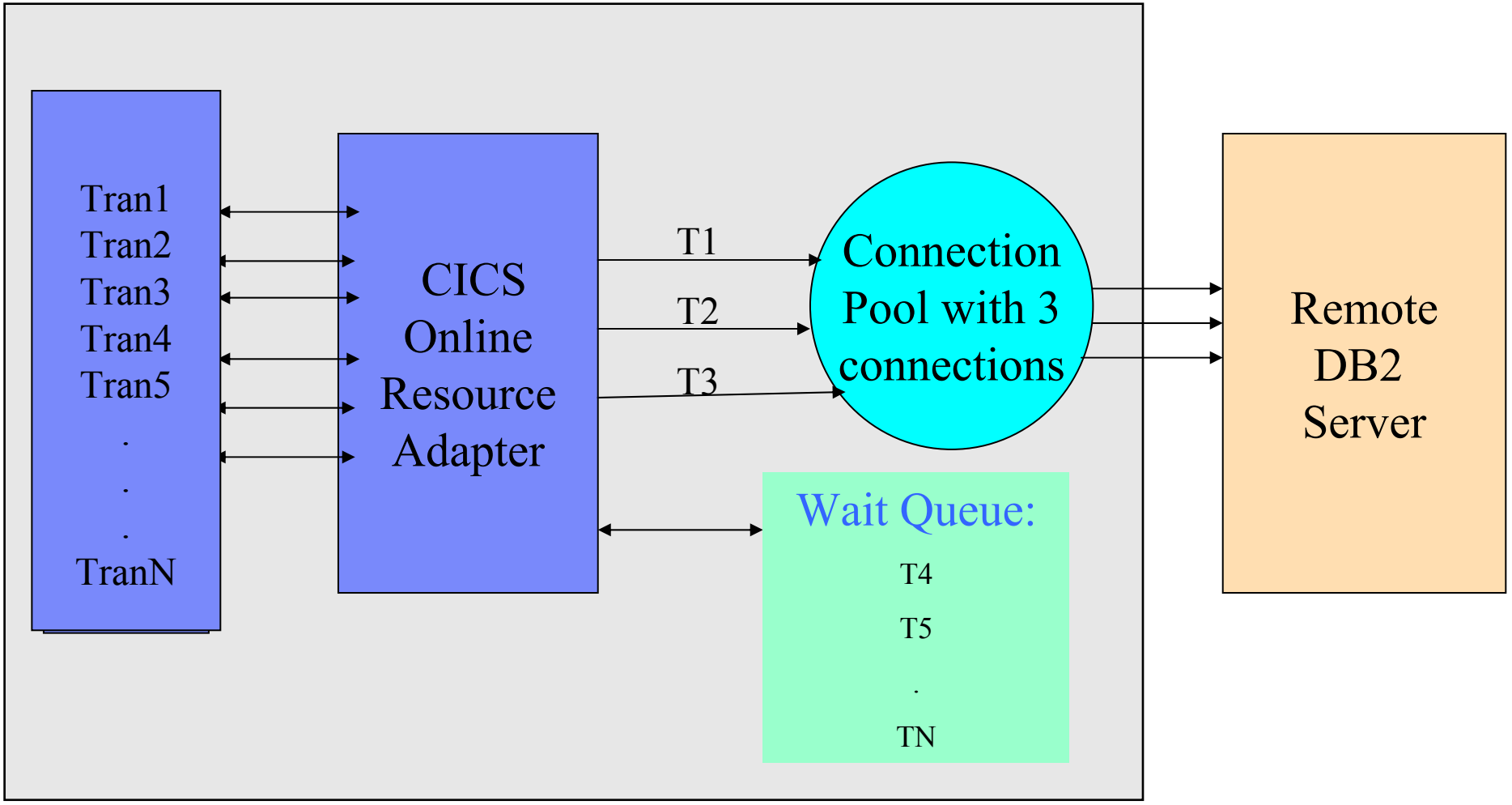
-Similar Performance for Batch Applications with Homogenous INSERTs

-PUT calls like INSERTs calls also can reap the benefit of this feature

More information on this feature

- PK48616 – Documentation support for multi row
- Click here Technote for PK48616 for in depth technical information about using Multi row.

Connection Pooling for Online users over DRDA TCP/IP



Connection Pooling for Online Users

Benefits of this feature:

- Subsecond response time for User transactions, if a connection is free to be allocated
- UserID switching is no more slow and happens in a blitz
- Large VSE Online applications with database accessing routines which perform CONNECT on every entry have the highest benefit

Connection Pooling Usage Considerations and Limitations

User locks on TCP/IP link **and** a pseudo agent unlike in private protocol only pseudo agent is locked for a user. This causes the link to not be sharable until

- CICS transaction *TERMINATES*
- User *switches* to another database by issuing a CONNECT *TO*
- User issues COMMIT *WORK RELEASE*

Connection Pooling Usage Considerations and Limitations

Wrong userid/password information causes the TCP link to get closed by the DB2 LUW server.

- This leaves a bad link in the connection pool.
- Bad link is replenished *after the error*
- The next CONNECT that uses this link will go through fine.
- But this link reestablishment *causes performance slowdown.*

Connection Pooling for Online Users

Limitations and Considerations:

- Users have to wait if all connections in the pool are exhausted
- DB2_SERVER_CONTIMEOUT at the server should be disabled to avoid lost connections in the pool
  - default is 180 sec, in DB2 LUW 8.2 FP12 and 9.1 GA version
  - 0=no timeout, available in DB2 LUW 9.5 GA or 9.1 FP5 or 8.2 FP16
- CONNTIMEOUT – is for idling IP connections (Connection pool opens an IP socket – not a connection to DB2)

Recommendations:

Option for Online users only, that connect to a remote database with a high number of users with efficient use of resources for creating those many connections

Batch Implicit Connect

Business value for this feature:

- VSE Batch application need not have a CONNECT statement in the application program
  - if the parameter IMPLUSER is used while defining the DBNAME database directory
  - // SETPARM USERID = <userid> defined in the JCL invoking the application program
- IMPLICIT CONNECT – is an unsecured feature – paswords are send unencrypted over the wire

Future focus in DB2 Server for VSE and VM releases

- More Capacity
- Interoperability performance
- More SQL Capabilities
- Preprocessor Enhancements
- Data Migration Tool Kit

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Section 1

New Features in DB2 Server for VSE & VM Version 7.5

Section 2

Connectivity from DB2 VM/VSE client to other DB2 LUW servers

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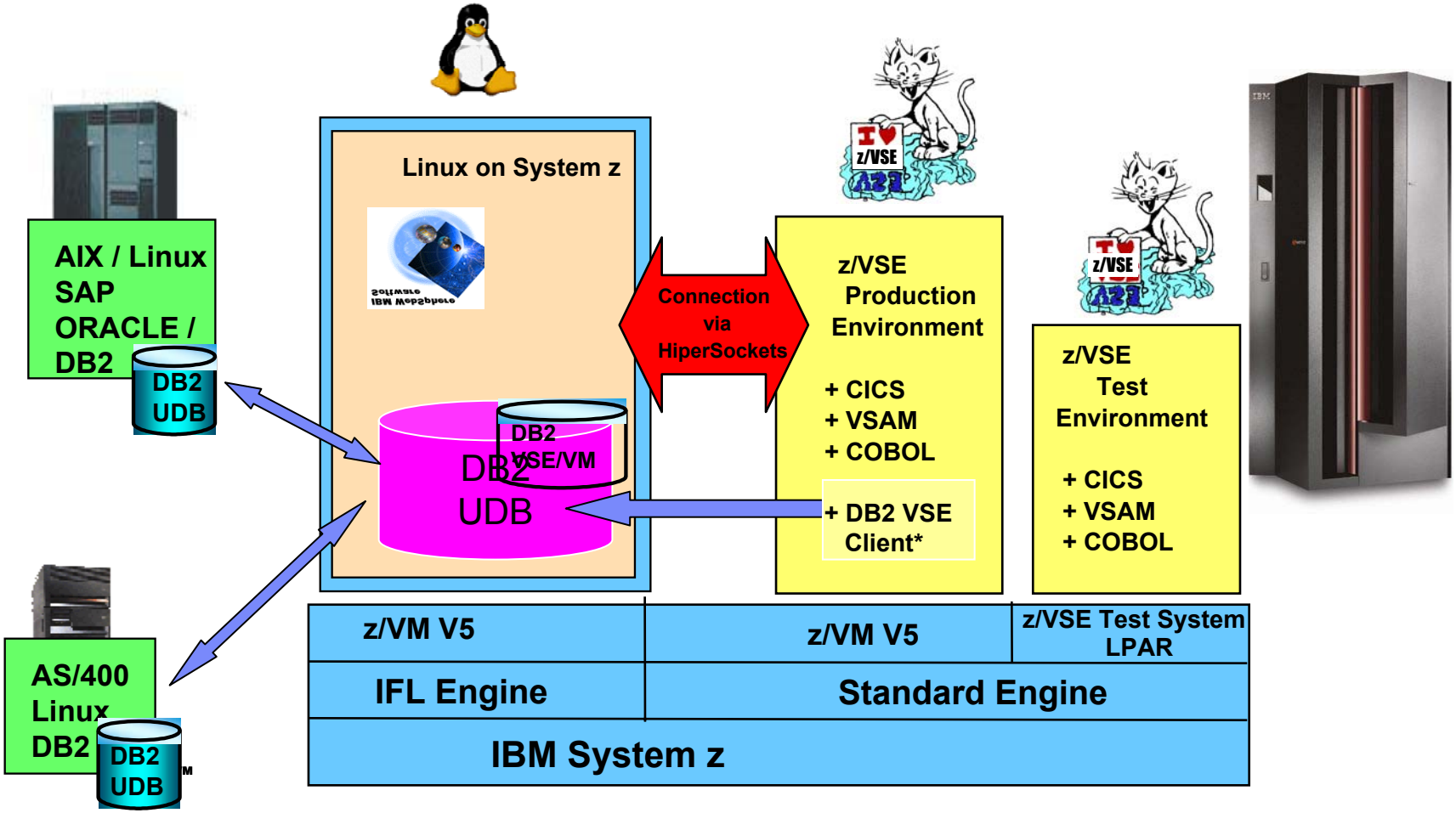
Section 2

Connectivity DB2 VM/VSE to other DB2 LUW servers

- DB2 VM/VSE Client scenario
- setup
- compatibility
- performance

DB2 / VSE Client Scenario – with DB2 on Linux



(*) DB2 VSE Client – the client functionality only, can be obtained with DB2 for VSE & VM 7.5 Client Edition

VM Requester Setup

- DRDA code must be enabled by doing optional post installation steps.
- Update COMDIR with IP address, TCP port and user id information
- Run SQLINIT PROTOCOL (AUTO or DRDA)

DB2/VM Requester Configuration for TCP/IP

- Create ARICTCP MODULE
- Create new CEEPIPI MODULE (user exit)
- LINK and ACCESS TCP/IP client disk
- Determine target server IP address and port number
- Update COMDIR file

Sample COMDIR Entries for TCP/IP

```
:nick.TCPVM3    :service.SQLMACJD
                :host.9.89.24.109
                :security.PGM
                :userid.USERID
                :password.PASSWORD
                :dbname.SQLMACJD
```

VSE Requester Setup

- DRDA code must be enabled (linkedit job for corresponding interface – LE, ASM, EZASMI)
- Update DBNAME directory
- Setup SQLGLOB
- Setup / Execute BIND (DBSU, ISQL, Applications)
- Setup CICS for online access to remote DB2 server

  (define transactions in IUI 28 –security)

VSE Requester Setup (via TCP/IP)

- Define in DB2 VSE database directory the remote database server TYPE=REMOTE.
- Must contain DBNAME (and optionally ALIAS) entries.
- Must contain TCPPORT entry to define which port the target database server is listening on for incoming TCP/IP connections.
- Must contain either
  - IPADDR entry to define the IP address of the target database server

  or
  - TCPHOST entry to define the host name of the target database server
- May contain SYSDEF entry to define a system default.
- May contain PARTDEF entry to define a partition default.

Sample DBNAME Directory entry

TYPE=REMOTE

DBNAME=SAMPLE

ALIAS=DB2NT_TCP

TCPPORT=50000

IPADDR=9.9.9.9

SYSDEF=N

PARTDEF=F4

CONNPOOL=Y

PWUPPER=Y

PWDENC=N

SQL function list and compatibility between DB2 (VM/VSE) and DB2 (LUW)

- AVG, COUNT, MAX, MIN, SUM functions works the same
- CHAR(time-expression), CHAR(timestamp-expression), CHAR(date-expression) functions work the same if the date-time format chosen is the same
- CHAR(decimal-expression) Not working the same. For DB2/VSE&VM, a leading blank is added if the decimal expression is positive. Whereas UDB (LUW) requires a trailing blank to be added if the decimal expression is positive. An APAR will be created to change the behavior of this function.
- DATE function works the same if the date format chosen for the database is the same for both
- DAY, DAYS functions works the same

SQL function list and compatibility between DB2 (VM/VSE) and DB2 (LUW) (..contd)

- DECIMAL, DIGITS functions work the same
- FLOAT function works the same except for the display format.
- HEX Function returns EBCDIC character in case of DB2 on VM/VSE while ASCII in the case of DB2 on LUW
- HOUR function works the same
- INTEGER DB2 for VM/VSE supports only numeric arguments while DB2 on LUW supports numeric,character-string,date and time expression as argument
- LENGTH function works the same
- MICROSECOND function works the same
- MINUTE, MONTH, SECOND function works the same
- STRIP Function Not supported in the case of DB2 on LUW
- SUBSTR function works the same
- TIME function works the same if the time format chosen for the database is the same for both

SQL function list and compatibility between DB2 (VM/VSE) and DB2 (LUW) (..contd)

- TIMESTAMP function works the same
- TRANSLATE function works the same
- VALUE function works the same
- YEAR function works the same

SQLAM (SQL Appl. Mgr. Level) support:

DB2 VM is at SQLAM 5. It will remain at SQLAM 5 till we make developmental changes to the DRDA code to bring it up to SQLAM 7. However, any database client/server that is at a higher SQLAM level (like DB2 for LUW and z/OS) will deprecate itself to SQLAM 5 when talking to a lower DB2 client/server . In effect, everything SQLAM 5 allows you to do , will still be possible with a DB2 VM --> DB2 LUW and z/OS connection. All the SQLAM 7 functionality present on DB2 LUW or z/OS will be ignored.

VSE SQL statements incompatible with LUW servers

- Switch from EBCDIC to ASCII codepage implies changed collating sequence.
  - affects sort order
  - BETWEEN clauses

Solution : Define the database in Linux using a user collating sequence like EBCDIC collating sequence.

- Use of multi byte code sets like UNICODE (UTF-8) may lead to application problems because of variable length
  - DB2/LUW fixed characters specifies the byte length!

Solution: Use SBCS codepages for database on LUW

Customer Test results – DRDA and Performance

- It is highly recommended to start with a POC

- VSE Applications with DB2 VSE Client App
- DB2 7.5 Proof of Concept – Results
- Benefits of DRDA Communication Performance Enhancements
- Multirow Insert or Buffered Insert over DRDA – analysis
- Connection Pooling – analysis
- Related APAR's and technotes

DB2 7.5 PoC - Conclusion

- DB2/VSE 7.5 Client Edition
  - Gives some relief in CPU usage
    - nearly 20% relative to the average usage with 7.4
  - A higher concurrency didn‘t cause higher (peak) CPU usage
  - Peak CPU usage increased by 30% relative to DB2/VM
    - 17 % increase in total (with 7.5)
  - Batch jobs show high differences in CPU usage and runtime comparing 7.4 to 7.5 on VSE
    - DBSU about 20% less CPU relative to 7.4
    - Application about 50% less CPU in 7.5 relative to 7.4

Recommendations and more information

- Every project should start with a POC !!!

- More information for DB2 server for VM and VSE

  http://www-01.ibm.com/software/data/db2/vse-vm/

- Documentation

  http://www-01.ibm.com/software/data/db2/vse-vm/directory.html#VSE7.5

- Write to DB2VSEVM@ca.ibm.com for specific questions