TPF Users Group – Fall 2012

Websphere Transaction Cluster Facility (WTCF)
"Your Companion to z/TPF"

Jamie Farmer
Applications Subcommittee

What is WTCF?

- **Built on DB2 shared data technology – DB2 pureScale**
- **Clustered solution with each WTCF node running on the IBM AIX operating system for Power processors**
  - **Linux Support is on the roadmap for WTCF**
- **Combination of application infrastructure and database management**
- **Supporting workloads that require:**
  - Consistent speed and high transaction throughput requiring a high update rate with 24x7 availability
  - Scalability to grow, incrementally and smoothly, with your business
  - Shared, always consistent, view of mission critical information required to process transactions
- **WTCF is a bundled offering that includes:**
  - IBM WebSphere Application Server
  - IBM DB2 Enterprise Server Edition
  - IBM DB2 pureScale feature for Enterprise Server Edition
  - WTCF Tivoli Monitoring Agent

WebSphere Transaction Cluster Facility

- *Announced: 9/20/2011*
- *Available: 9/23/2011*

Workload optimized for performance, efficiency and scalability

Value of WTCF Data Model

- **Uses a networked model of pointer based linkages grouping the pieces of interrelated data for their intended purpose.**

- Simplifies the programming, simplifies the management of the data and reduces path length.

Relational

Table 1

Table 2

Table 3

Table 4

Table 5

Table 6

WTCF
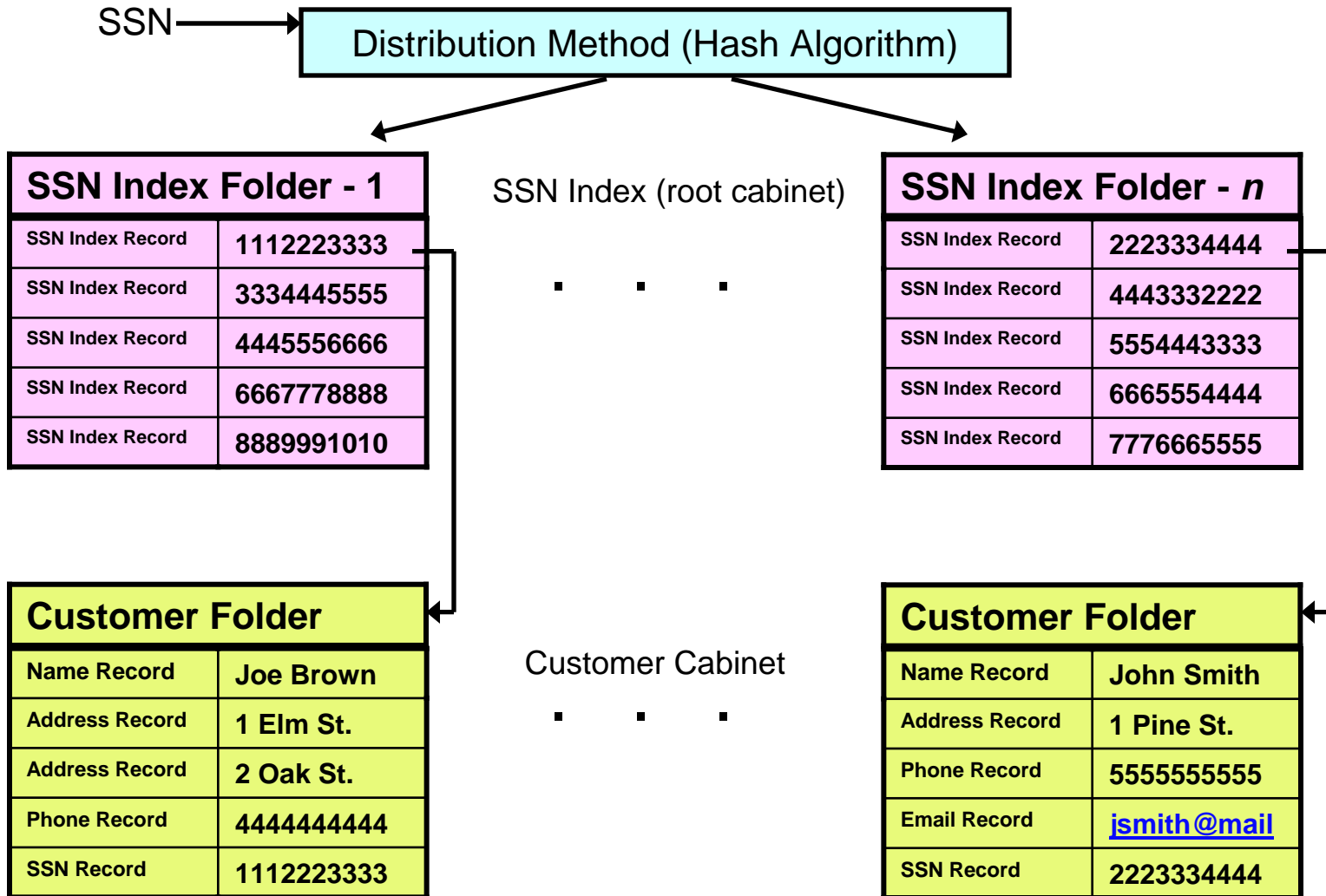
Search Path   Search Path   Search Path
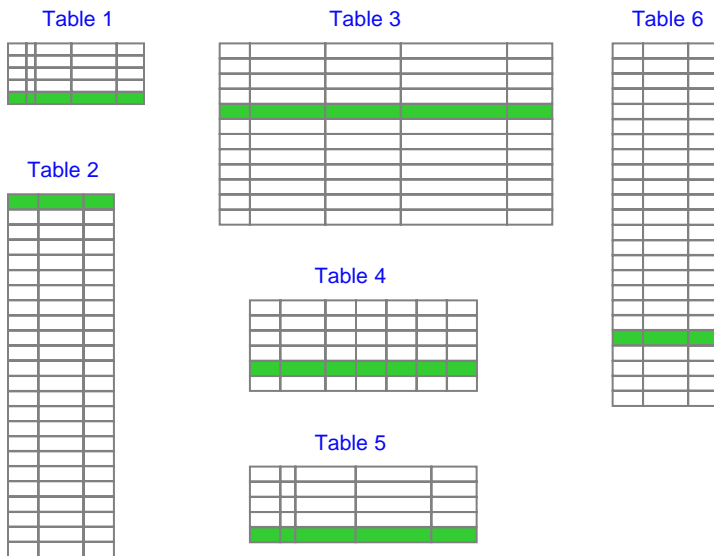
- **Reads that span multiple tables incur more IO and join processing**
- **Updates and Inserts that span tables increase lock times, IO processing and drive index processing**
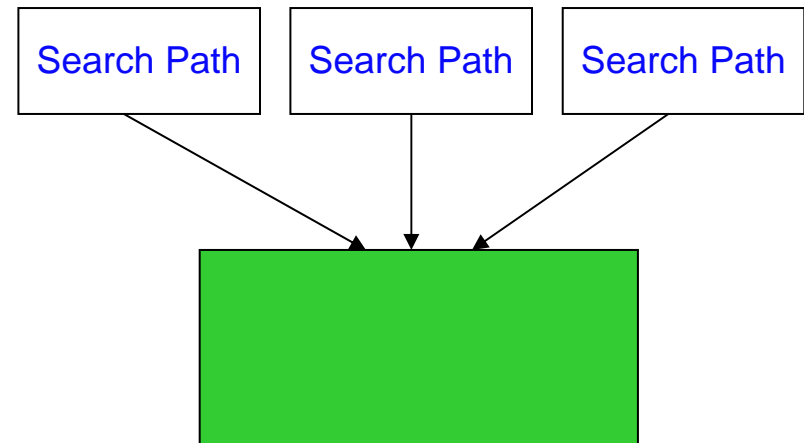
- **No expensive joins**
- **All data stored together as a single database entity**

WTCF Hierarchical Data Model

SSN → Distribution Method (Hash Algorithm)

SSN Index (root cabinet)

SSN Index Folder - 1	
SSN Index Record	1112223333
SSN Index Record	3334445555
SSN Index Record	4445556666
SSN Index Record	6667778888
SSN Index Record	8889991010

SSN Index Folder - *n*	
SSN Index Record	2223334444
SSN Index Record	4443332222
SSN Index Record	5554443333
SSN Index Record	6665554444
SSN Index Record	7776665555

Customer Cabinet

Customer Folder	
Name Record	Joe Brown
Address Record	1 Elm St.
Address Record	2 Oak St.
Phone Record	4444444444
SSN Record	1112223333

Customer Folder	
Name Record	John Smith
Address Record	1 Pine St.
Phone Record	5555555555
Email Record	jsmith@mail
SSN Record	2223334444

How Does WTCF use DB2?

WTCF DB2 Table

ID	Blob (4K)

- **WTCF is based on DB2 relational technology, but how it uses it is very unique**
  - To DB2, the WTCF data stored on the database is considered opaque
    - DB2 has no knowledge of what the data looks like – just a blob of data
    - It's the WTCF layer that supplies the knowledge as to what the data means
      - DB2 being used as a data store
      - RAS capabilities of DB2 are inherent in WTCF.
- **DB2 tables used by WTCF consists of two columns**
  - 8-byte unique identifier
  - 4-K blob of data
- **The WTCF system pre-carves the tables for use by WTCF to eliminate updates to the DB2 tables**
  - The unique identifier is not updated and inserts are not performed
  - All the locking is done at the row level.
- **WTCF maps the WTCF data constructs into rows within these DB2 tables.**
  - WTCF applications don't interface with DB2 directly to obtain or manipulate WTCF data.

Features of WTCF

- **Single, shared, predefined database model**
  - Database layout is shared between DBA and applications
  - Database artifacts are automatically generated for use by the application
    - Increases developer productivity as coding to the database layout defined by the administrator is easy
  - Allows for the system to enforce data integrity

- **Object Oriented**
  - Everything is viewed as an object in WTCF
  - Mapping objects into the database is seamless with WTCF
    - Data is saved on disk in a format that objects can be easily created from
    - No expensive O/R mapping needs to be performed

- **Multi-tenancy**
  - Each tenant uses the same database layout, but the system manages separation of data between them.
    - Subsystem user support on z/TPF

- **Flexibility**
  - WTCF allows for versioning of database information allowing for easy expansion

Sample WTCF Cluster
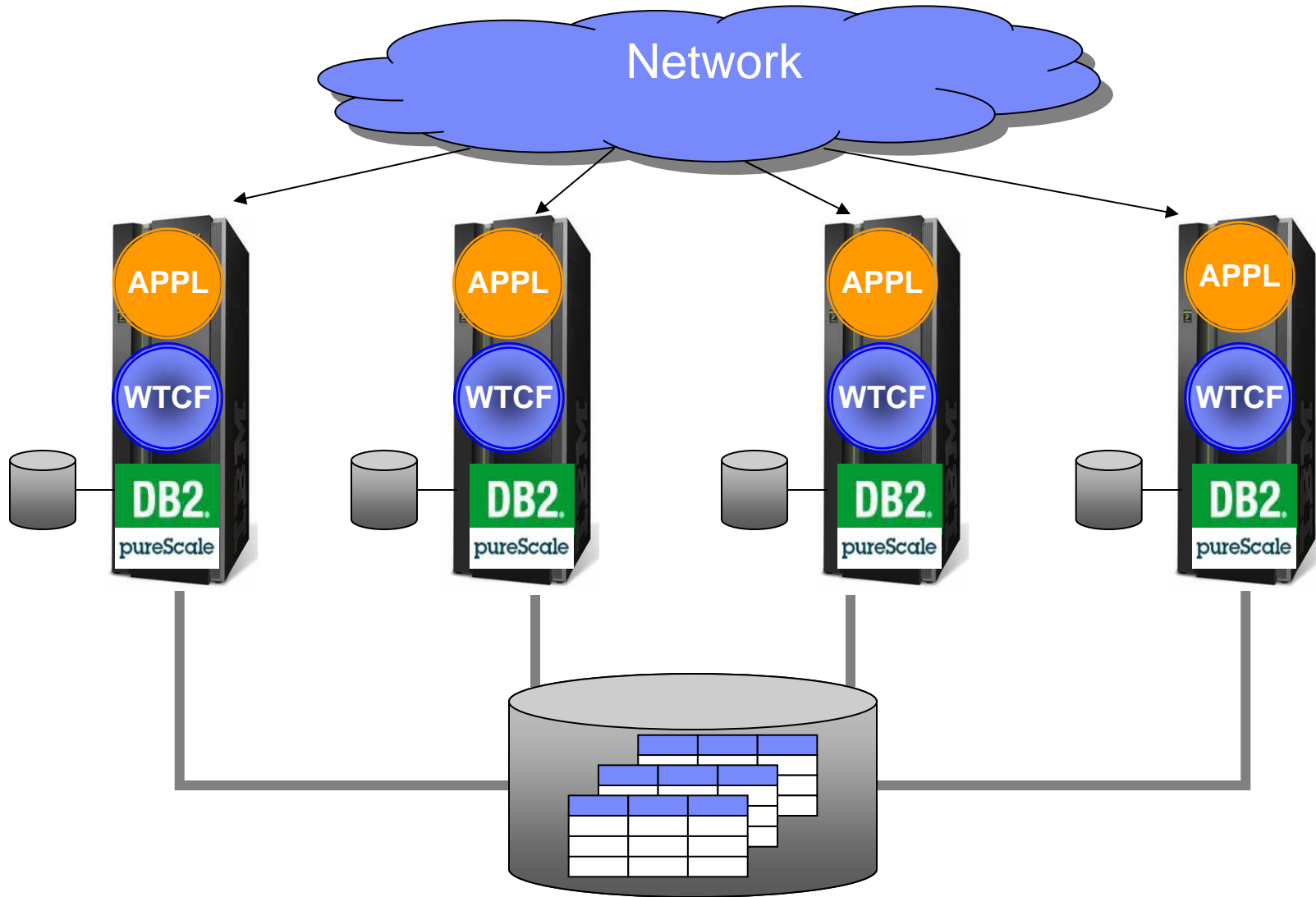
What role can WTCF Play in your z/TPF Enterprise?

- **Database architecture similar to z/TPF**

  - For example, how data is organized for customer data on z/TPF can be organized in the same manner on WTCF

- **Ability to code object oriented applications like Java**

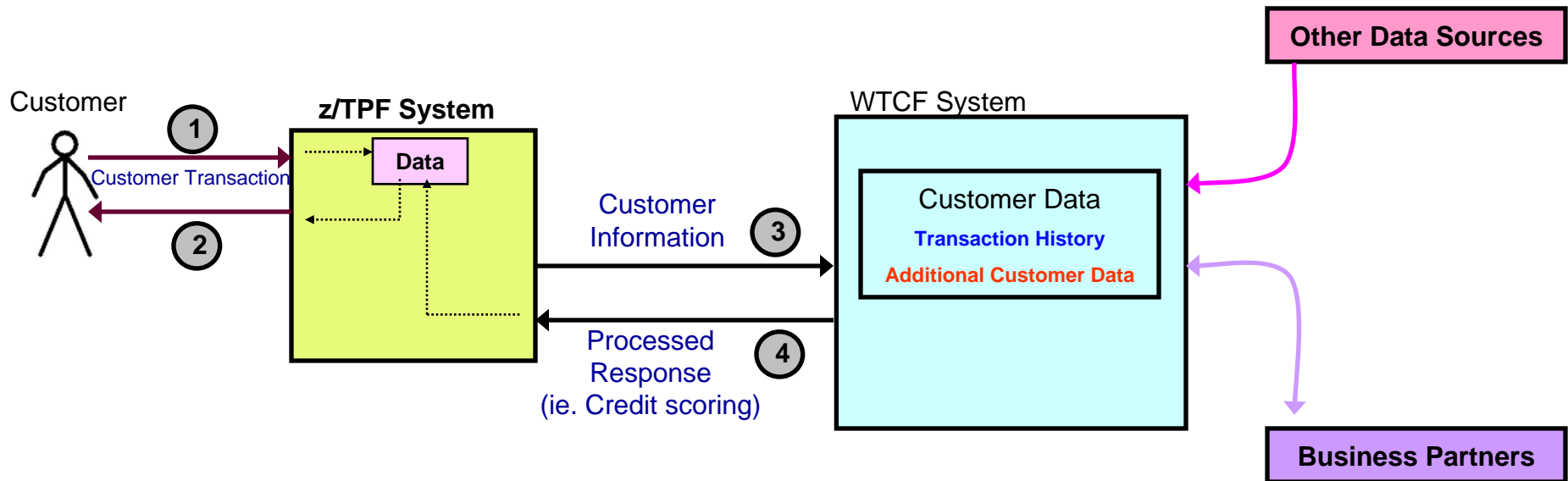 - Better time to market on new applications

Scenario 1 : Offloading z/TPF Data For Use By New Applications
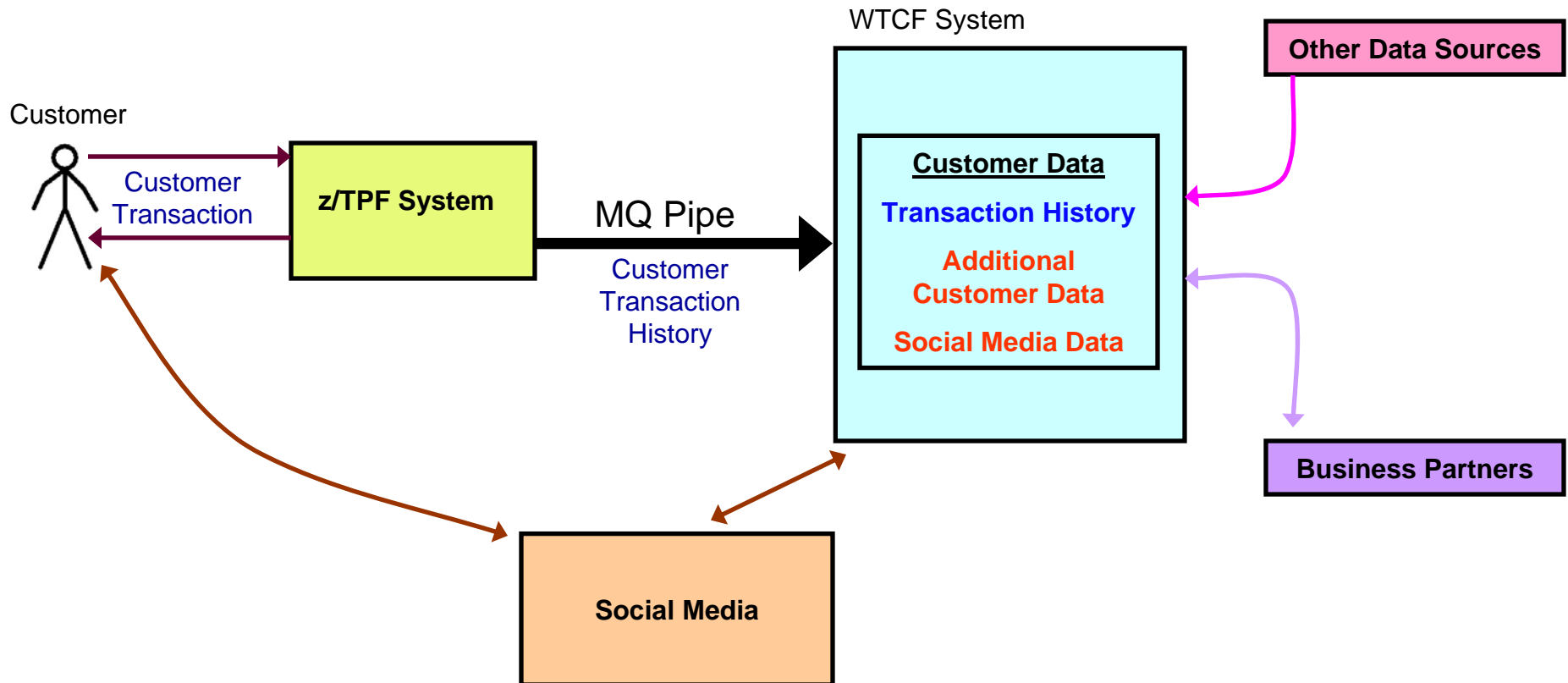
Some z/TPF data is asynchronously transferred to WTCF through an MQ pipe, for example, transaction histories
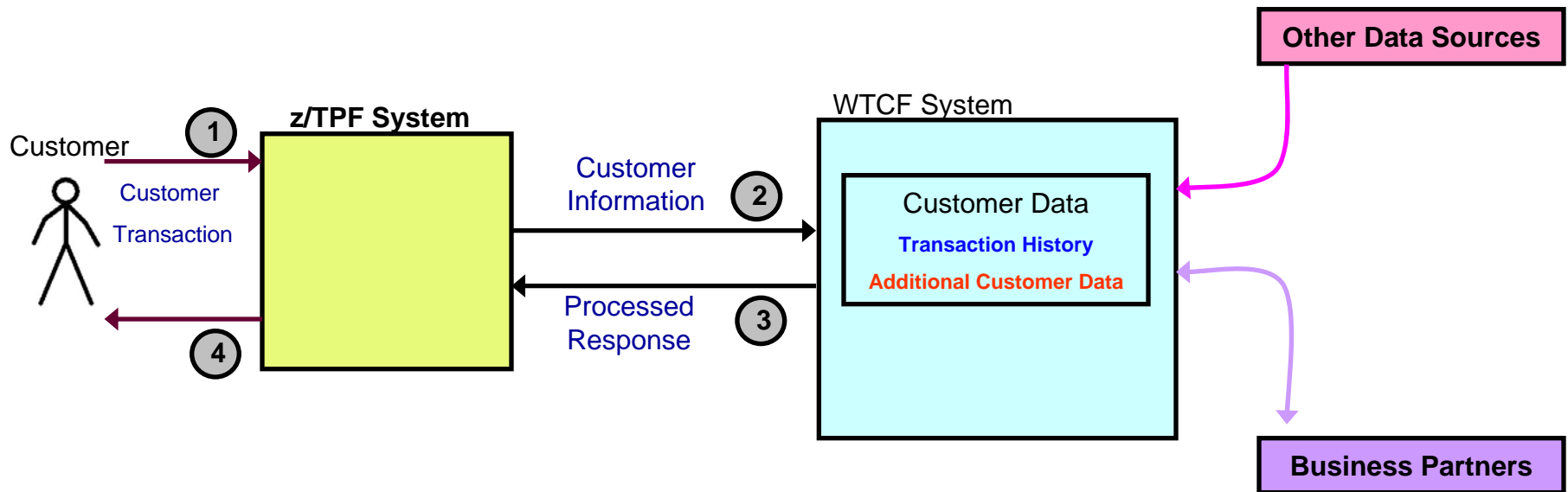
New WTCF applications can be written using the offloaded z/TPF that is augmented with data from other sources (ie. Social media, business partners, etc)

Scenario 2 : Pushing z/TPF Data For Processing And Receive Response

Other Data Sources

Customer

z/TPF System

①
Customer Transaction

Data

②

WTCF System

Customer
Information ③

Processed
Response
(ie. Credit scoring) ④

Customer Data
Transaction History
**Additional Customer Data**

Business Partners

- After some transactions complete, z/TPF data is asynchronously transferred to WTCF.

- WTCF performs processing using the data sent from z/TPF and from other sources.

-The response is sent, updating data within z/TPF for use in subsequent transactions.

Scenario 3 : Using WTCF Inline in the z/TPF Transaction

Other Data Sources

z/TPF System

WTCF System

Customer

①

Customer

Transaction

Customer
Information ②

Processed
Response ③

④

Customer Data

Transaction History

Additional Customer Data

Business Partners

- During the z/TPF transaction, a synchronous flow could be made to the WTCF system

- Using z/TPF data and data from other sources, the WTCF performs some processing

- A response is sent back to the z/TPF and is used to complete the transaction.

Scenario 4 : Using WTCF as a Front End to z/TPF
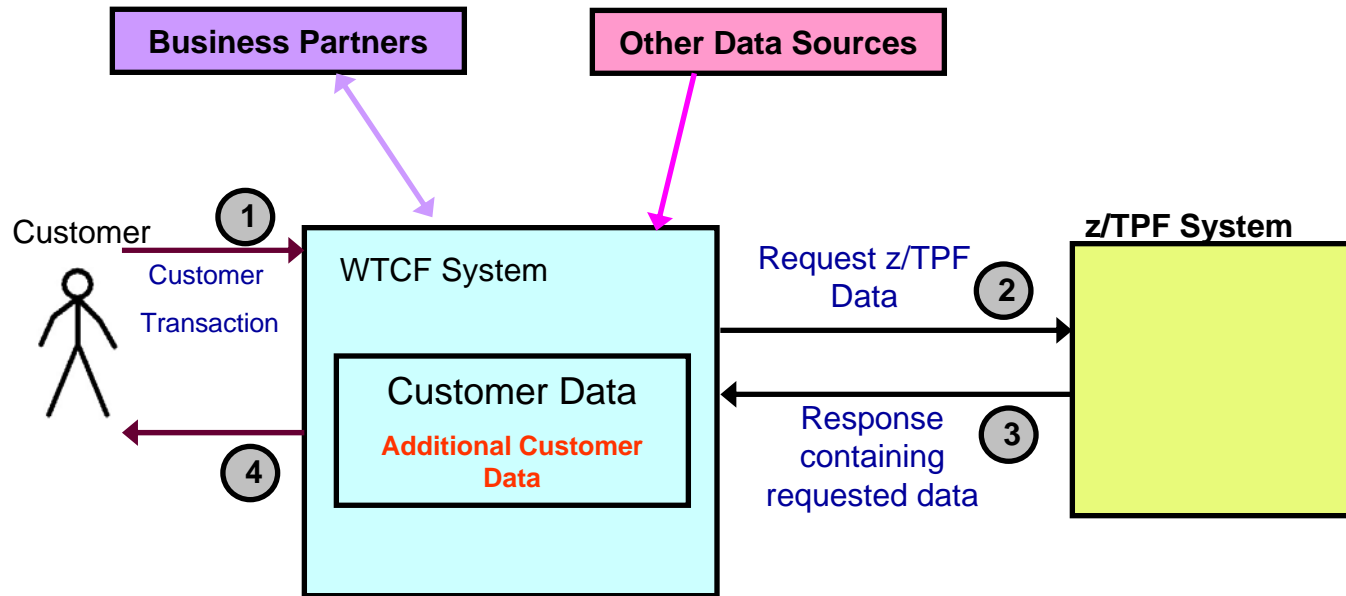
- Customer transaction would be received by WTCF.

- The WTCF application could request data residing on z/TPF.

- Using the data from z/TPF and data from other sources, WTCF completes the transaction.

Summary

- **What role can WTCF play in your z/TPF Enterprise?**

  - Writing new database intensive applications that require z/TPF data along with data from other sources.

- **Are there areas in your enterprise outside of z/TPF where WTCF could be of value?**

- **Questions, Comments, Ideas?**

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Backup

IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

WTCF Components