

Business Events Update

Chris Filachek
z/TPF and z/TPFDF Architecture &
Development



Business Events Delivered Enhancements

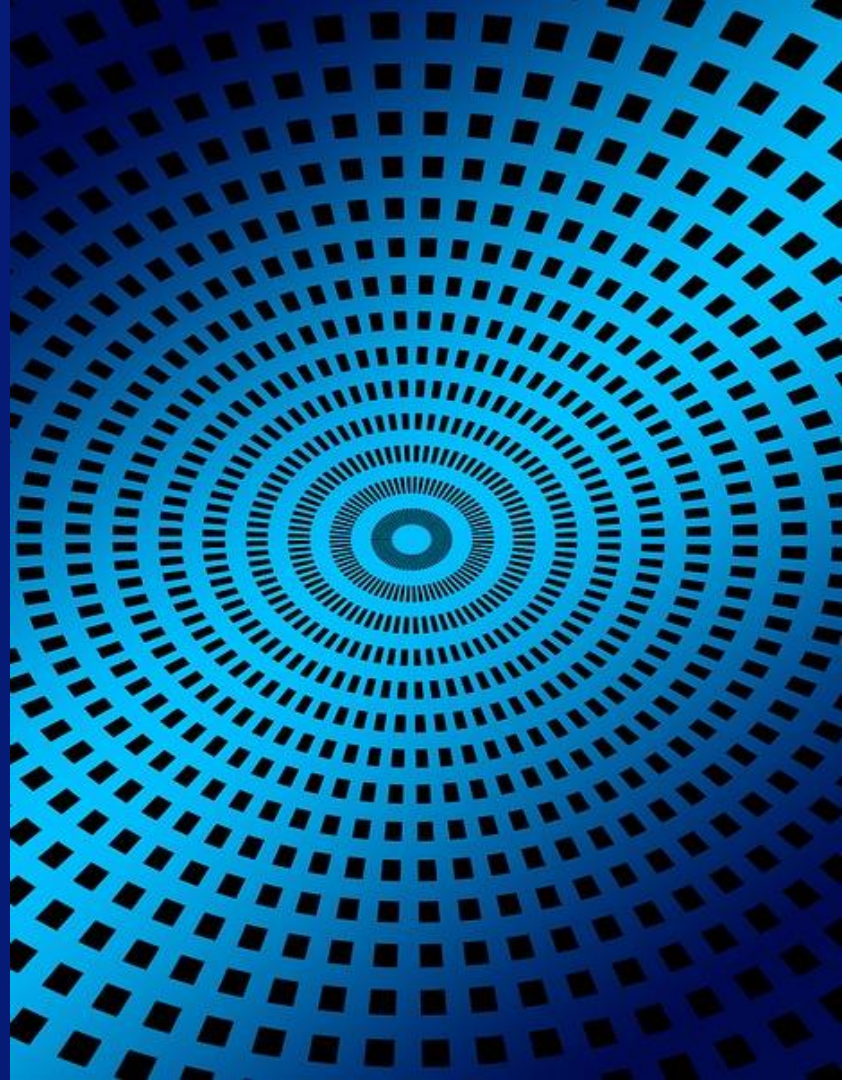
z/TPFDF Data Events without HOLD

- **Previously:** Data events for z/TPFDF were created only when a subfile was opened with HOLD
 - What about databases that can be updated without HOLD?
 - Subfiles can be updated without HOLD if DB010C=NO is coded on the DBDEF
- **Now:** Data events can be created for subfiles opened without HOLD
 - If updates without HOLD are allowed, data events are created regardless of HOLD status
 - No change in behavior for subfiles that must be opened with HOLD for updates
- APAR PI86942



z/TPFDF Data Event Partition Filter

- **Previously:** For a z/TPFDF file with partitions, data events are created for all subfiles across all partitions
 - Each partition may represent different users or customers
 - May want to create data events for some partitions and not others
- **Now:** Enable a subset of partitions for data events in the business event specification
 - Use the <partitionIncludeList> element to define which partitions are enabled for data events
 - Data events are only created for listed partitions
 - No change in behavior if <partitionIncludeList> element is not defined
 - Data events are created for all partitions
- **APAR PI89192**



z/TPFDF Data Events: Collecting Updated LRECs

- When collecting updates, a data event contains changed LRECs
 - Unchanged LRECs are not part of the data event
 - May contain important context
 - For example: Customer ID or name
 - Event consumers can't process events without proper context
- Automatically collect LRECs when the subfile is opened and before changes are made
 - Use collectOpen="Y" attribute on <lrec> element to identify LREC IDs to be collected
 - LREC IDs with collectOpen="Y" are collected during subfile open and when updated
 - Easily include important context in your data events from seldom updated LRECs
- **APAR PI89192**

Business Event Specification

```
<eves:esDataEvent>
  <eves:zTPFDF>
    <eves:collectionType>
      Updates
    </eves:collectionType>

    <eves:lrecIncludeList>
      <lrec id="80" name="CustIDlrec"
        collectOpen="Y" />

      <lrec id="90" name="Translrec" />
    </eves:lrecIncludeList>

  </eves:zTPFDF>
</eves:esDataEvent>
```

z/TPFDF Data Events: Collecting Subfiles

- When collecting subfiles, a data event contains all LRECs in the subfile
 - Collects LRECs asynchronously after the subfile is closed by the application
 - Deleted subfiles do not contain any LRECs
 - Data events for deleted subfiles may not have proper context
- Use collectOpen attribute to collect LRECs when the application opens the subfile
 - Deleted subfiles only - Data events include LRECs collected during collectOpen processing
 - Does not affect subfile collection for created and updated subfiles
 - Collect LRECs asynchronously and ignore collectOpen LRECs
- APAR PI89192

Business Event Specification

```
<eves:esDataEvent>
  <eves:zTPFDF>
    <eves:collectionType>
      Subfile
    </eves:collectionType>

    <eves:lrecIncludeAll>
      <lrec id="80" name="PNRIDlrec"
        collectOpen="Y" />
    </eves:lrecIncludeAll>

  </eves:zTPFDF>
</eves:esDataEvent>
```

New JSON & XML Formats

- Format business events as JSON or XML documents
 - Use <afStandardFormat> element in the dispatch adapter specification
 - Documents based on event message format
 - DFDL for event message format is specified by <esEventMessageFormat> element in business event specification
- Parses directly from binary to desired document
 - Efficient - No intermediate infonodes
 - Transformation Engine eligible
- Documents are encoded using UTF-8
 - If transmitting over MQ, set <charSetName> element in dispatch adapter to UTF8

JSON

APAR PJ44767

Example:

```
{"Event": {
  "EventHeader": {
    "size":61,
    "structID":"C5C8",
    "version":1,
    "ECBCtxFlag":0,
    "UsrCtxFlag":0,
    "eventName":
      "MySampleEvt",
    "eventType":2,
    "ssuName":"BSS",
    ...
  },
  "EventData": {
    "EventDataHdr": {
```

XML

APAR PJ44894

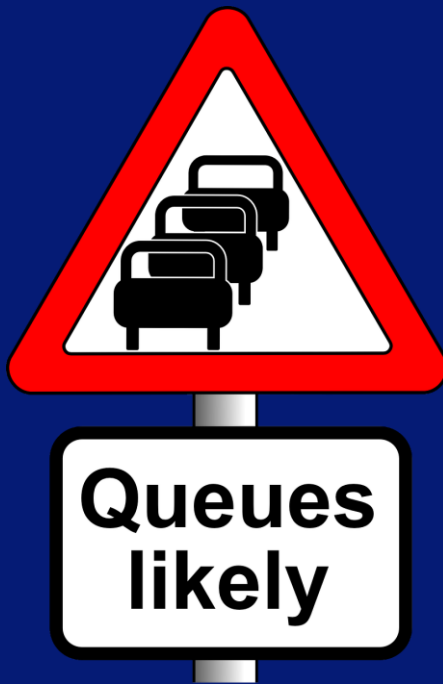
Example:

```
<MySampleEvt:Event>
  <MySampleEvt:EventHea
    <ibev:size>61</ibev:si
    <ibev:structID>C5C8</i
    <ibev:version>1</ibev:v
    <ibev:ECBCtxFlag>0</i
    <ibev:UsrCtxFlag>0</ib
    <ibev:eventName>MyS
      </ibev:eventName>
    <ibev:eventType>2</ib
    <ibev:ssuName>BSS</i
    ...
  </MySampleEvt:EventHea
  <MySampleEvt:EventDa
    <MySampleEvt:EventD
```

Transmit using Unique Remote Queue Names

Previously: Transmit business events over MQ using a single remote queue name

- Define the queue name using the <queueName> element in the dispatch adapter
- Example: SEND.TO.OPS
- All processors in the loosely coupled complex use the same queue name
- All events go to the same event consumer
- May overload a single event consumer



Now: Transmit business events over MQ using a different queue name for each processor

- New attribute adds the processor ID as a suffix to the queue name
- Use suffixType=".procid" attribute on <queueName> element
- Examples: SEND.TO.OPS.A
SEND.TO.OPS.B
- Events can go to different event consumers

APAR PJ45085

Business Events Data Areas & Formats

Business Event Data Areas

Event Message

IBM

Event Header

- Event name, timestamp, intercept name, etc.
- Initialized and managed by z/TPF system

User

Event ECB Context

- Optional user area shared across events for an ECB

User

Event User Context

- Optional user area unique to an event

User or IBM

Event Data

- Signal Event: User data passed from tpf_bev_signal() API
- Data Event: Database context and data captured by z/TPF system

User

User Format Data

- Optional data area separate from the business event



ECB and User Context

- Event ECB Context
 - Context across all events for this ECB
 - For example: message type (booking, reaccommodation, credit auth), ECB information, etc.
- Event User Context
 - Context specific to this event
 - For example: PNR ID for this PNR subfile
- For both types of context
 - User defined size and structure
 - Added through application or dispatch enrichment programs
 - Part of the event - Included in standard formats
 - Must be defined by the event message DFDL schema

Event Message

IBM

Event Header

- Event name, timestamp, intercept name, etc.
- Initialized and managed by z/TPF system

User

Event ECB Context

- Optional user area shared across events for an ECB

User

Event User Context

- Optional user area unique to an event

User or IBM

Event Data

- Signal Event: User data passed from tpf_bev_signal() API
- Data Event: Database context and data captured by z/TPF system

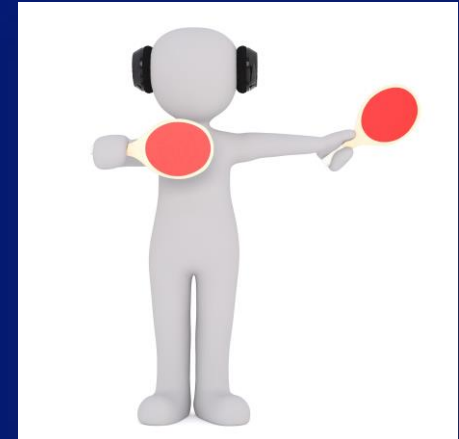
User Format Data

- User format data is “extra” data that is passed along with the event
 - It is NOT part of the event
 - Pass control information, formatting instructions, etc. between user programs
 - Stage context information for later processing
 - Use for any other event processing needs
- Created, accessed, and changed in user programs
 - Application enrichment program
 - Dispatch enrichment program
 - Event custom data format program
- See the `tpf_bev_data_format_user_data` structure in the `tpf/ibev.h` header file
 - Structure is a length field followed by an undefined data area
 - User defined size and data area

User

User Format Data

- Optional data area separate from the business event



Business Event Standard Formats

- Format the event message using a predefined set of formats
- Formats the event message using the DFDL schema in the business event specification
 - Includes all event message components
 - DFDL schema specified by `<esEventMessageFormat>` element
- Specify format using `<afStandardFormat>` element in the business event dispatch adapter specification
 - JSON
 - XML
 - NONE (Binary)
 - CBE (Common Base Event)

Event Message

IBM

Event Header

- Event name, timestamp, intercept name, etc.
- Initialized and managed by z/TPF system

User

Event ECB Context

- Optional user area shared across events for an ECB

User

Event User Context

- Optional user area unique to an event

User or IBM

Event Data

- Signal Event: User data passed from `tpf_bev_signal()` API
- Data Event: Database context and data captured by z/TPF system

Business Event Custom Format

- Use event custom format programs to create user defined formats
 - User written program that formats the event
 - Any format you need - binary, character, mixed, custom JSON / XML, or anything else
 - Formatted event must be a single continuous area of ECB heap
- Format program is called by business event dispatch processing before transmit
- Specify event custom format program name using the `<afEventCustomFormat>` element in the business event dispatch adapter specification



For more information, see the z/TPF Knowledge Center

- For information on business events, see the “Business event processing” topic
- For syntax and examples on the business event specification and the dispatch adapter specification, see “Deployment descriptors” topic
- z/TPF Knowledge Center
<https://www.ibm.com/support/knowledgecenter/SSB23S>



Thank You!

Trademarks

IBM, the IBM logo, ibm.com and Rational are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at www.ibm.com/legal/copytrade.shtml.

Notes

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

All customer examples cited or described in this presentation are presented as illustrations of the manner in which some customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics will vary depending on individual customer configurations and conditions.

This publication was produced in the United States. IBM may not offer the products, services or features discussed in this document in other countries, and the information may be subject to change without notice. Consult your local IBM business contact for information on the product or services available in your area.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Information about non-IBM products is obtained from the manufacturers of those products or their published announcements. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Prices subject to change without notice. Contact your IBM representative or Business Partner for the most current pricing in your geography.

This presentation and the claims outlined in it were reviewed for compliance with US law. Adaptations of these claims for use in other geographies must be reviewed by the local country counsel for compliance with local laws.