z/TPF V1.1

TPF Users Group - Fall 2012

Title: z/TPF Business Events and Common Deployment

Name: Michael Shershin
Venue: Main Tent

AIM Enterprise Platform Software
IBM z/Transaction Processing Facility Enterprise Edition 1.1.0

Agenda

- **PJ39759 – Websphere Business Events on z/TPF**
  - Includes changes in TPF Toolkit
    - TPF Toolkit V.next scheduled for release in 4Q2012
- **PJ39754 – Common Deployment**

What is a Business Event?

- **An event is an item of significance that has occurred in the system that is usually related to a business process.**
- **A Business Event consists of:**
  - Trigger
  - Data gathering and enrichment
  - Data formatting
  - Data transmission
- **Example: For international travel, send changes in a manifest to government agencies that handle immigration and customs.**

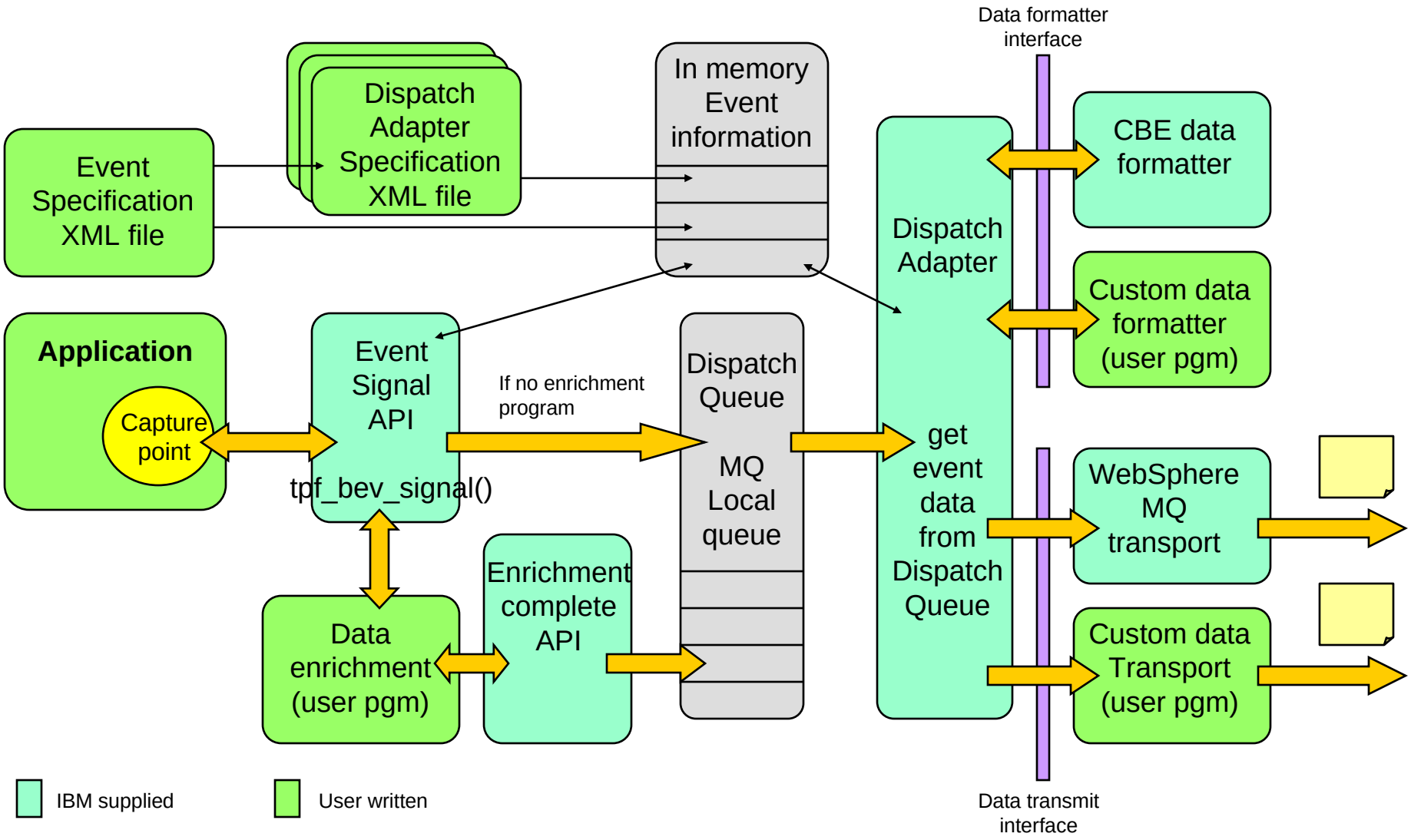
What is the value of a business event?

- **Send the right information at the right person at the right person.**
- **Facilitate real time observation of exceptional business behavior and notify the appropriate people.**
- **Provide data for dashboard display of real time business service availability.**

Business Events Glossary

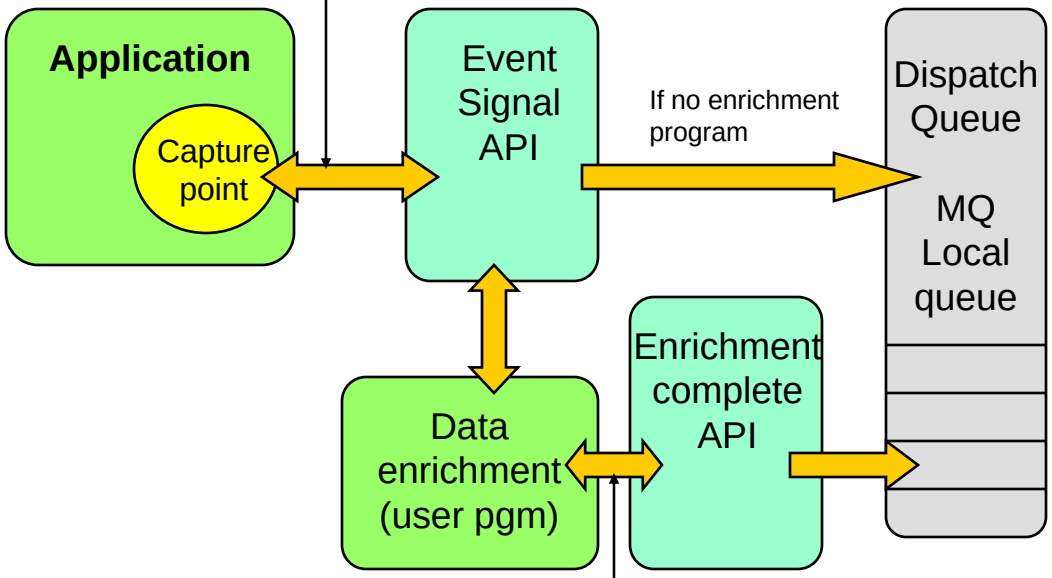
- **Business event consumer**
  - A location that receives data from a business event.
- **Business event dispatch adapter**
  - Transport mechanism that sends data to the business event consumer.
- **Business event specification**
  - An XML file that is the deployment descriptor for a single business event.
- **Business event dispatch adapter specification**
  - An XML file that is the deployment descriptor for a single business event dispatch adapter.
- **Business event dispatch queue**
  - A local MQ queue that allows asynchronous transmission of event data.

Business events architecture in z/TPF



Business Events APIs

```
tpf_bev_signal(char *eventName,
               int     dataLength,
               void *binaryData,
               char *interceptName)
```

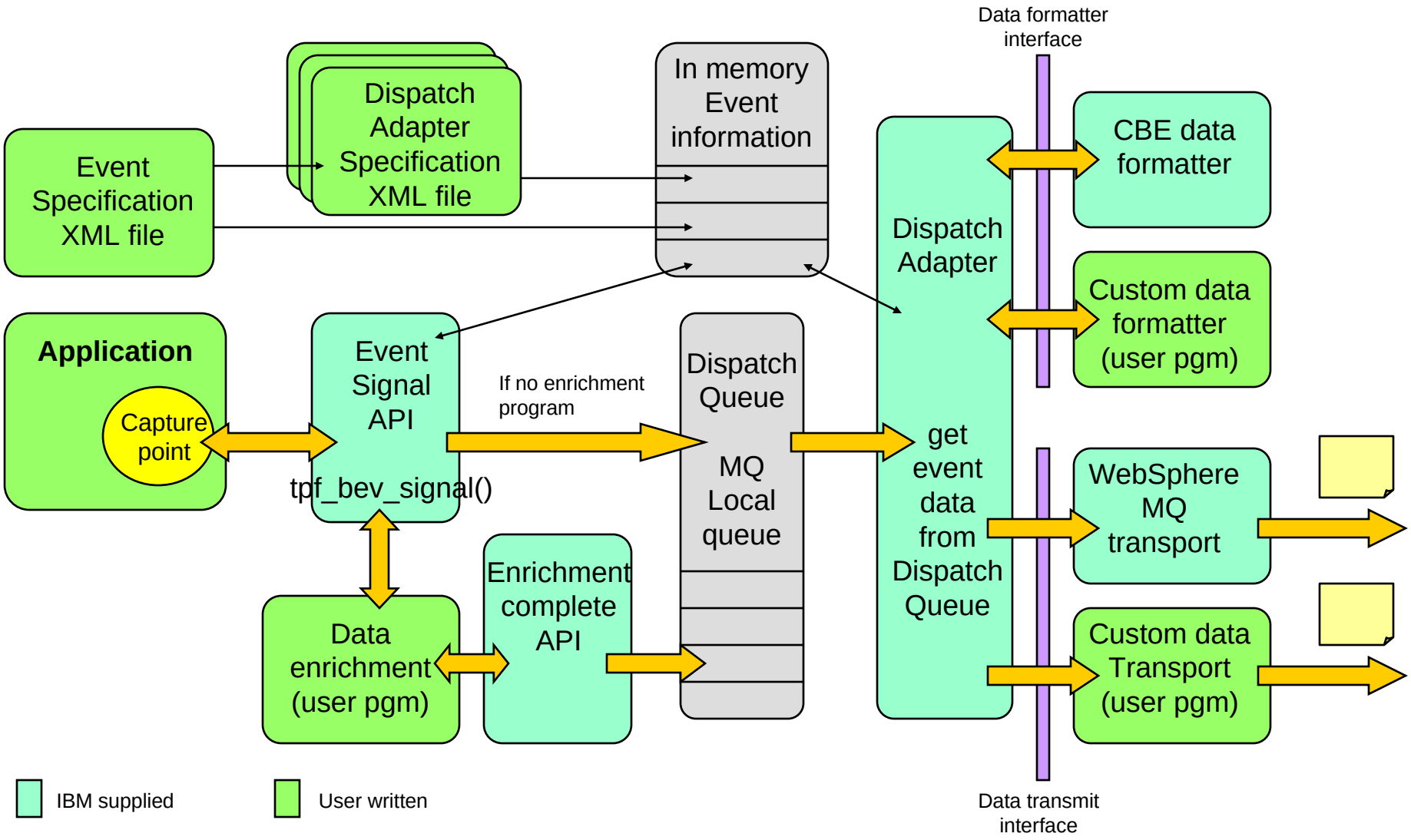


tpf_bev_signal_enrichment_complete()

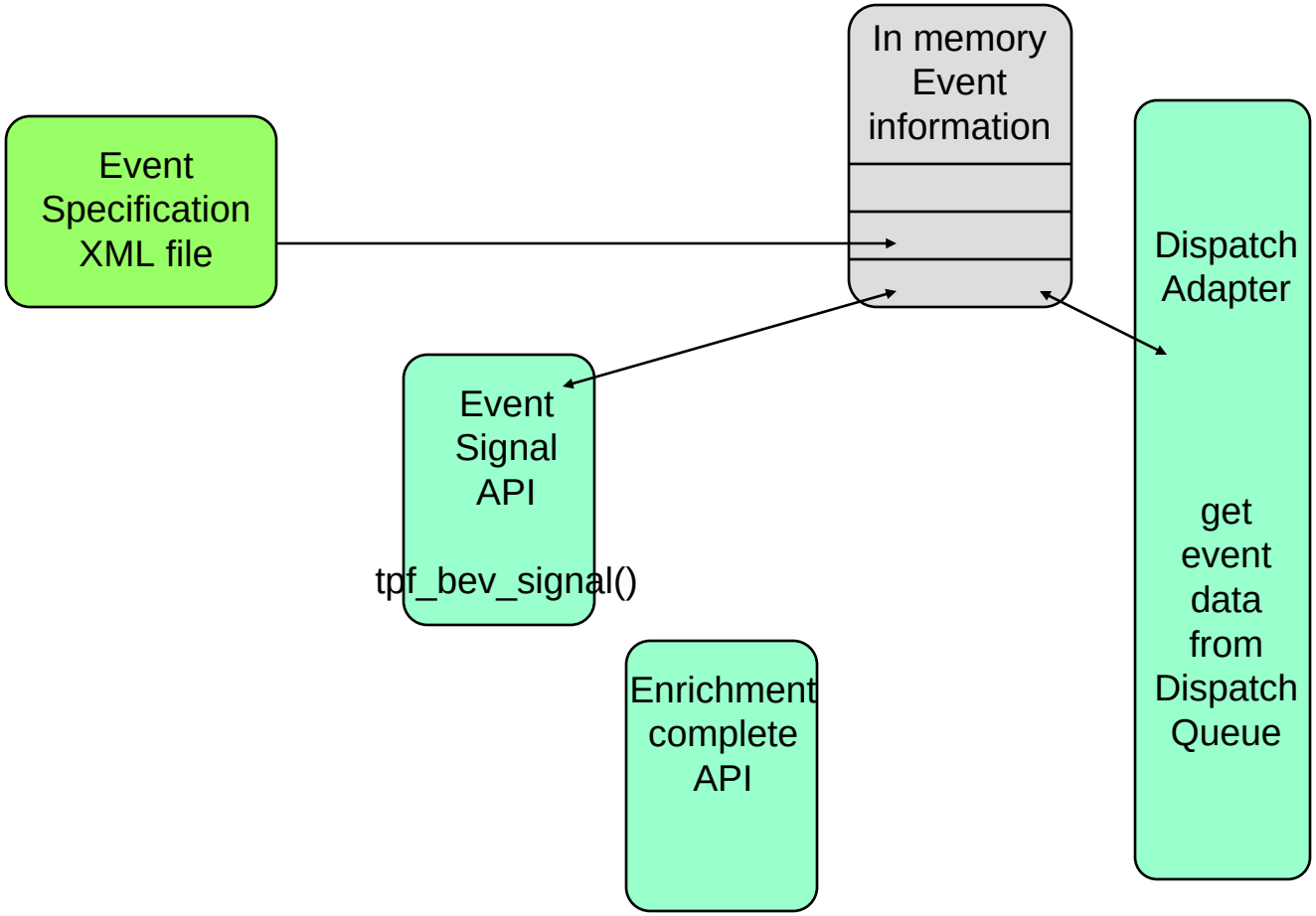
Business Events APIs

- **tpf_bev_signal()**
  - An event has happened.
  - Insert into your application process.
  - Event characteristics are in an event specification XML file
    - Event name is in event specification file
- **tpf_bev_signal_enrichment_complete()**
  - The enrichment program is complete. Send the event data to event consumers.
- **Event name provided on the APIs must match an event name in a deployed event specification file.**
- **Data can be passed on both APIs**
  - Data structure is defined in the event specification file.
  - Pass binary data such as a TPFDF LREC.
- **Intercept name is intended to identify a specific event call.**

Business events architecture in z/TPF



Event specification file



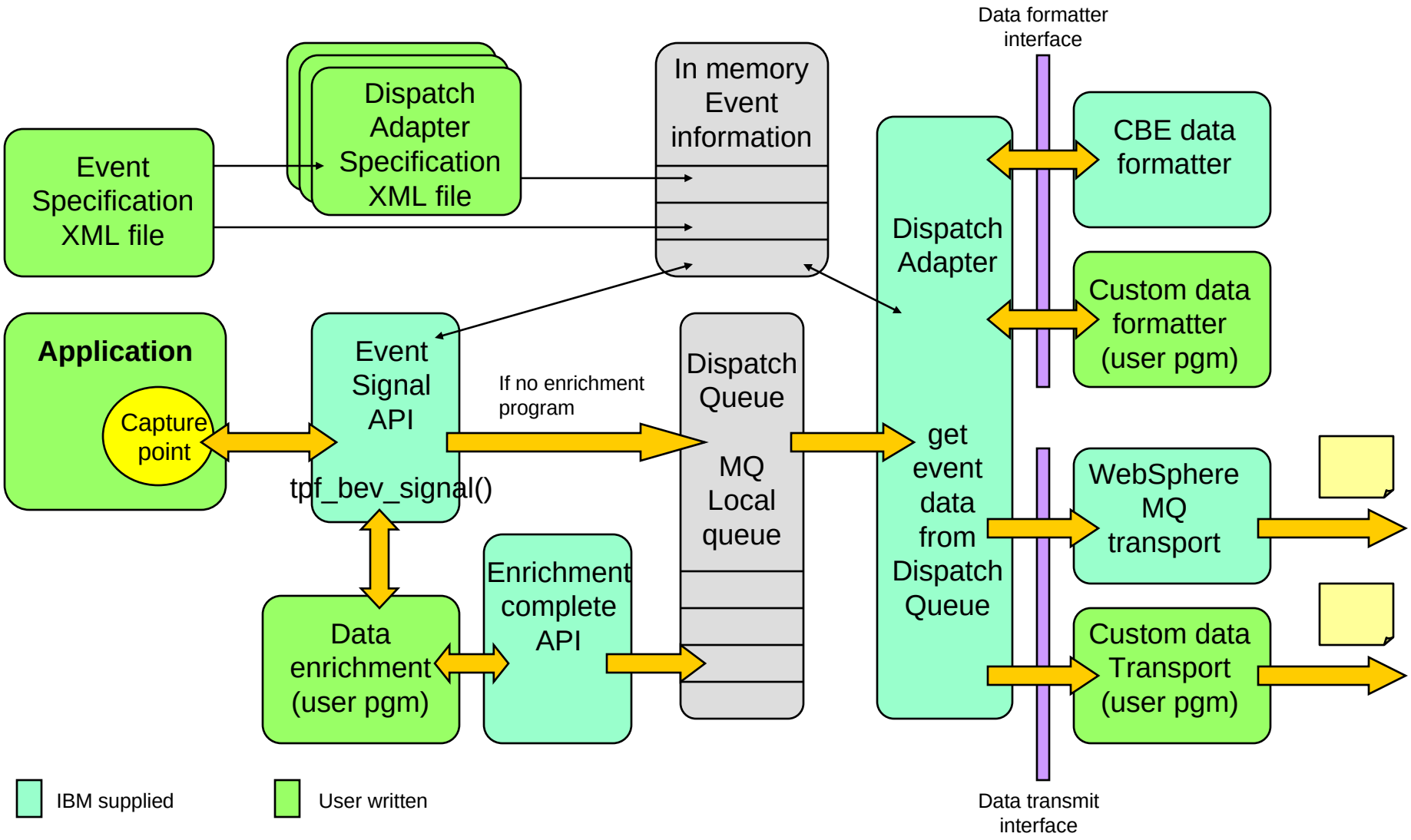
Event specification file

- **XML file that describes an individual business event.**
- **Managed by common deployment.**
  - Files loaded to TPF using E-type loader or image loader.
  - Files parsed once and results put into an in memory structure.
  - Must deploy an event specification file if this is the initial load of this file.
    - ZMDES DEPLOY FILE-*name*
- **Use TPF toolkit wizard to create Event Specification file.**

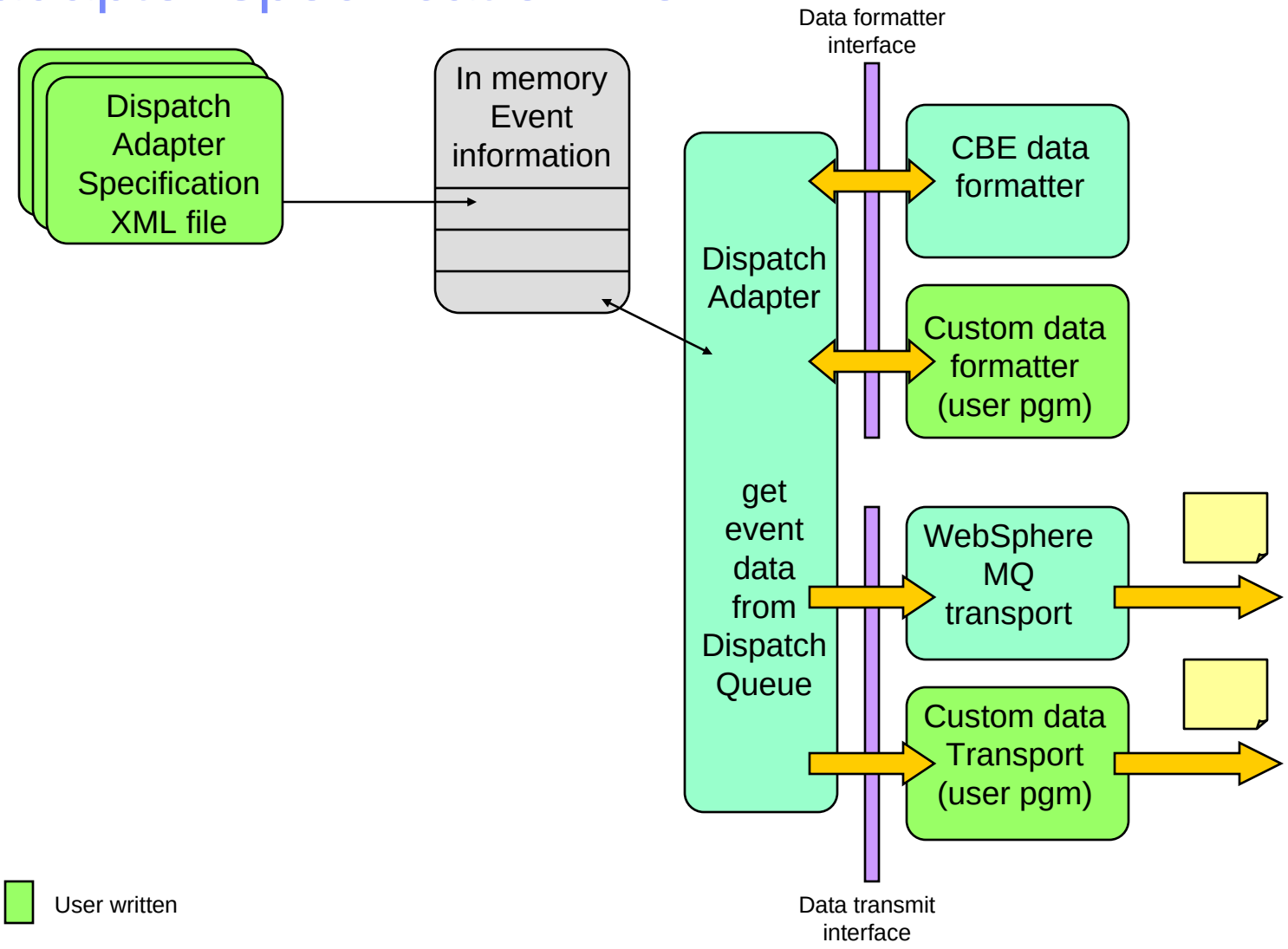
Event specification file contents

- **Event name**
- **Enrichment program (4 character name) (optional)**
  - If not specified, data provided on the tpf_bev_signal() will be added to the dispatch queue.
- **Dispatch queue name (optional)**
  - If not specified, the system default dispatch queue will be used.
- **Message properties**
  - Persistence
  - Priority
  - Expiry Time
- **Definition of data that is being captured.**
  - Represents the binary data that is being captured.
    - DSECT / C structure
  - Conforms to TPF Data Model (TDM).
- **List of dispatch adapters to use.**

Business events architecture in z/TPF



Dispatch adapter specification file



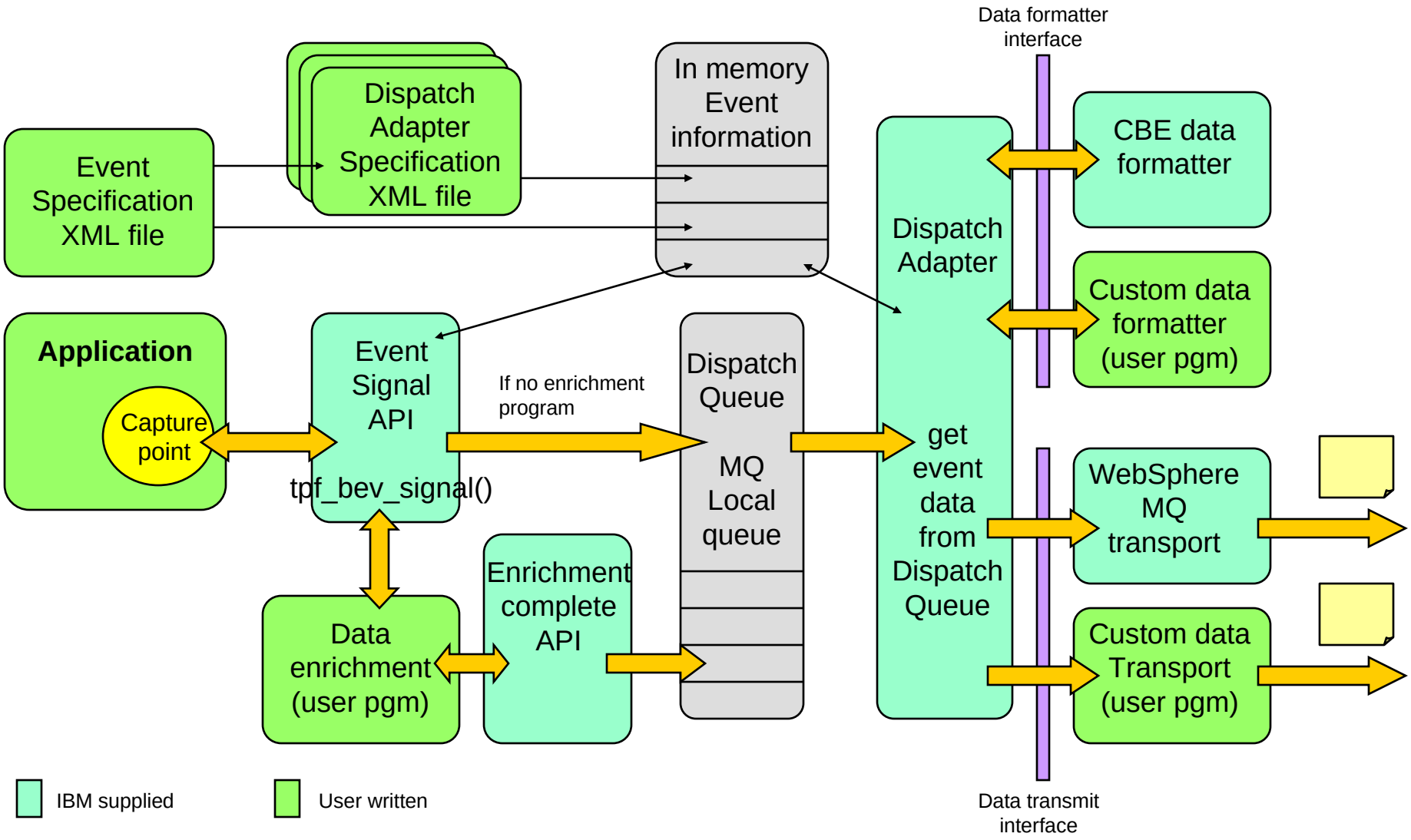
Dispatch adapter specification file

- **XML file that describes how to format data and where to send data.**
- **Managed by common deployment.**
  - Files loaded to TPF using E-type loader or image loader.
  - Files parsed once and results put into an in memory structure.
  - Dispatch adapter specification files are automatically deployed on the initial load of a specific file.
- **Dispatch adapter name is specified in the event specification file.**
- **Dispatch adapter is used after data is pulled from the dispatch queue.**
- **Use TPF toolkit wizard to create Dispatch Adapter Specification file.**

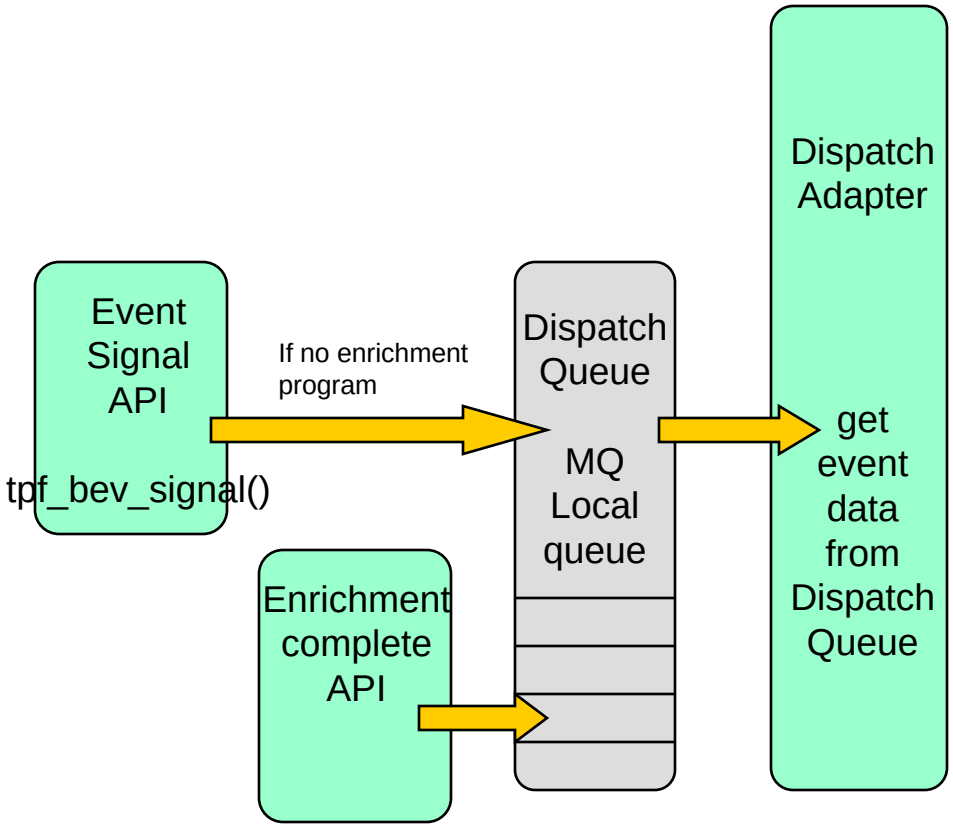
Dispatch adapter specification file contents

- **Dispatch adapter name**
- **Format**
  - Common base event (CBE) V1.0.1
  - Custom
    - 4 character program name
- **Adapter type**
  - WebSphere MQ
    - Queue name
  - Custom
    - 4 character program name
    - User unique data (i.e. IP address)

Business events architecture in z/TPF



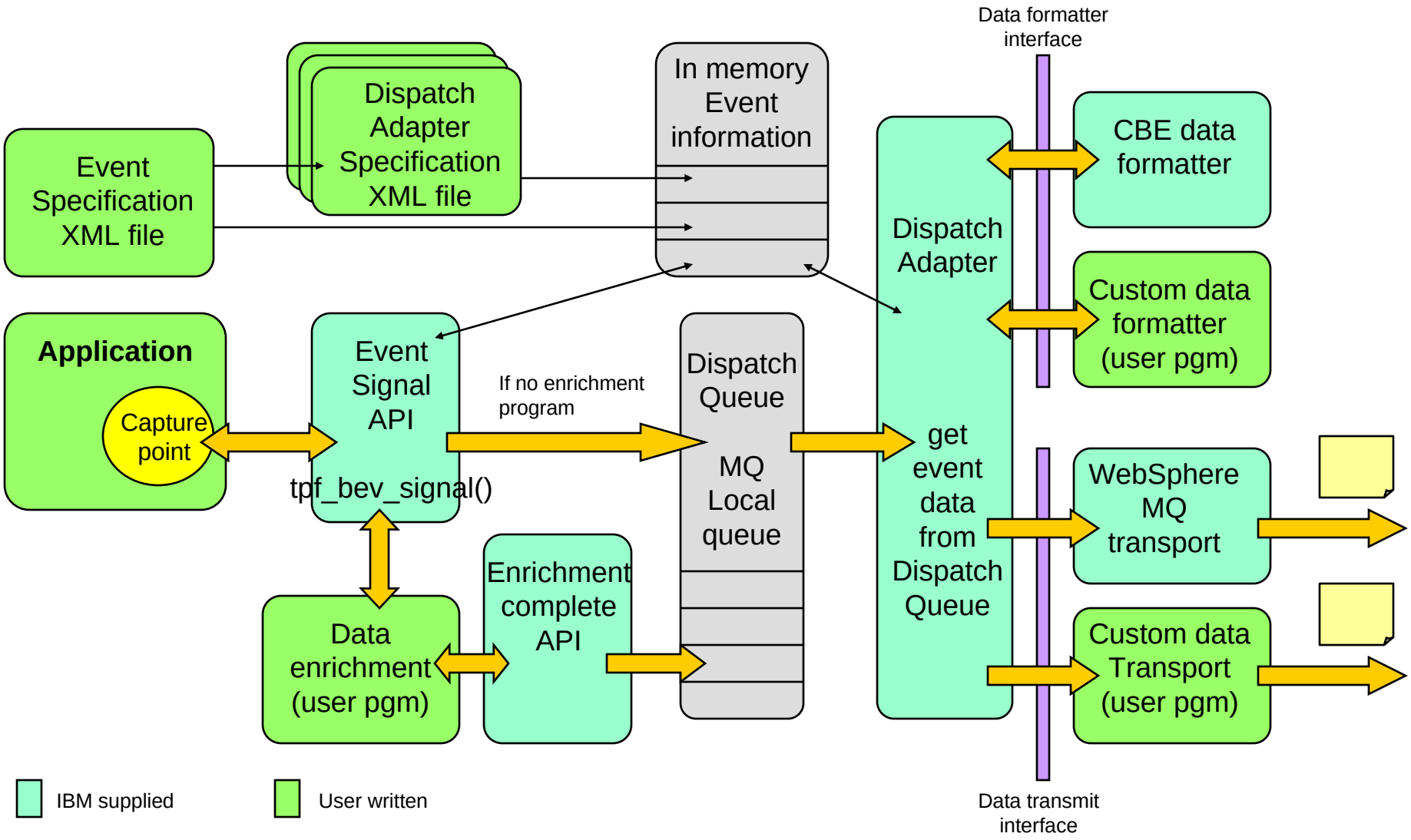
Dispatch Queue



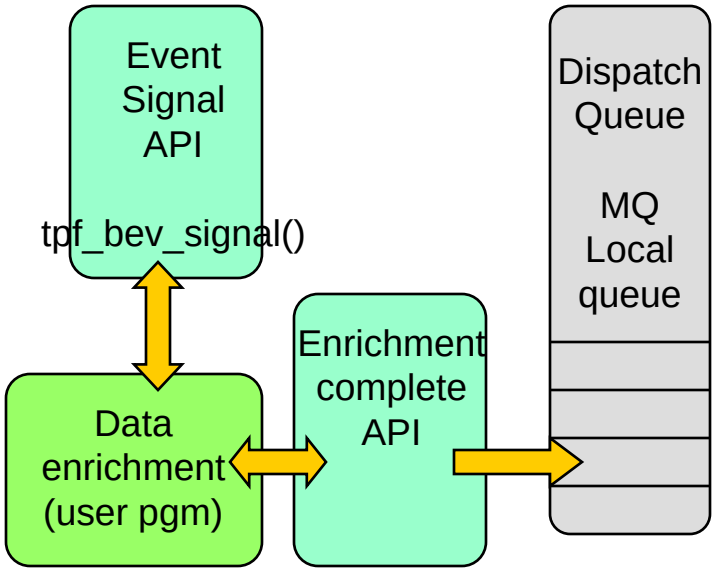
Dispatch Queue

- **Purpose is to disassociate the business event call from the transmission to the business event consumers.**
- **MQ local queue**
  - Allows the event processing to run in a commit scope when tpf_bev_signal() is called.
- **System default queue**
  - Used if dispatch queue is not specified in event specification file.
  - Does not guarantee order .
  - Multiple ECBs used to pull from dispatch queue.
- **User specified event dispatch queue.**
  - Specified in event specification file.
  - Guarantees order.
  - Only one ECB used to pull from each user specified dispatch queue.

Business events architecture in z/TPF



Enrichment program



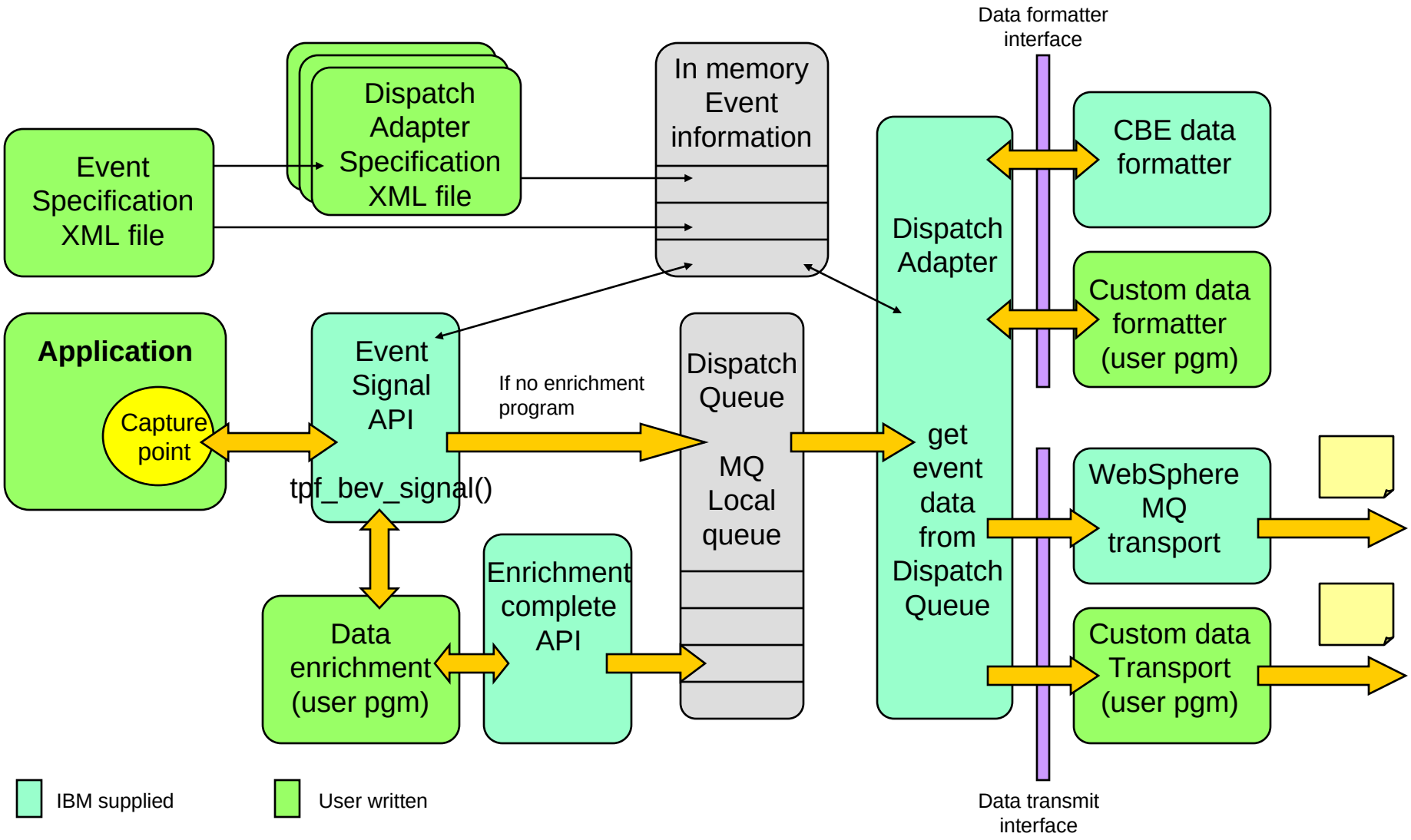
IBM supplied

User written

Enrichment program

- **Optional, user written program**
- **Used to gather additional information for the event that you want to pass to the event consumer.**
- **Entered by same ECB that called the tpf_bev_signal() API.**
- **Ability to modify message properties**
  - Expiry time, priority, persistence
- **Ability to identify which dispatch adapters to use**
- **Ability to pass information specify additional information to add to the CBE XML document**
- **When enrichment is complete, to continue event processing call API:**
  - tpf_bev_signal_enrichment_complete()

Business events architecture in z/TPF



Business Events Controls

- **Enable / disable business events by processor**
  - ZBEVF ENABLE
- **Maximum number of events that one ECB can signal in 1 second.**
  - ZBEVF SET MAXEVENTS-*value*
- **Maximum number of ECBs that can process events from the system default dispatch queue.**
  - ZBEVF SET MAXECBS-*value*
- **Maximum number of errors that can occur in 1 minute for a dispatch adapter before the dispatch adapter is automatically undeployed.**
  - ZBEVF SET MAXERRORS-*value*
  - User exit in UBEV allow users to decide how to handle errors.
- **System default dispatch queue depth warning value.**
  - ZBEVF SET QDEPTHWARN-*value*
- **Display control values**
  - ZBEVF DISPLAY SETTINGS
- **Use Format 2 Global: IBEVCNTL**

Various Business Events Displays

- **Display list of business events that are in memory**
  - ZBEVF DISPLAY EVENT
- **Display information about a specific business event**
  - ZBEVF DISPLAY EVENT *event_name*
- **Display list of dispatch adapters that are in memory**
  - ZBEVF DISPLAY DISPATCH ADAPTER
- **Display information about a specific dispatch adapter**
  - ZBEVF DISPLAY DISPATCH ADAPTER *adapter_name*
- **Display errors for both business events and dispatch adapters**
  - ZBEVF DISPLAY ERRORS
- **Display number of events over a specified period of time**
  - ZBEVF USAGE TIME-*value*

Business Events monitor

- **Verify that ECBs that are pulling items from the dispatch queue are still active.**
- **Warning messages**
  - If an error happened in the last minute, send a message indicating what error happened and the number of errors.
  - Once a minute if the number of messages on each dispatch queue is larger than QDEPTHWARN value, send a message to the console with the number of messages on the dispatch queue.

Common Deployment

Common deployment glossary

- **Common deployment**
  - A mechanism to make deployment descriptors available for use.
- **Common deployment configuration file**
  - A file that contains information about each piece of functionality that uses common deployment.
- **Deployment descriptor**
  - An XML file that is used to describe capabilities and options for a specific piece of functionality.

What is common deployment?

- **One use of XML files is to describe capabilities and options of functionality.**
  - Deployment descriptor
  - Requires XML file be deployed
  - Example:
    - Business event specification file
    - Business event dispatch adapter specification file
- **Deployed means:**
  - The XML file is parsed once
  - Results are put into a structure in memory
  - Mechanism to locate the in memory structure
- **Common deployment managed files are loaded to TPF using TPF loader.**
  - E-type loader (ZOLDR) and image loader (ZTPLD).
- **XML files are parsed:**
  - In restart
  - When a loadset that contains a deployment descriptor is activated (ZOLDR ACT)

What is common deployment?

- **Several common tasks that deployment for all deployment descriptors must do.**
  - Validate that the file exists
  - Maintain status of which files are deployed
  - After an IPL re-deploy the file
  - Provide a mechanism to find the structure in memory
  - Handle changes to the file (i.e. handle a file in a loadset that was activated or deactivated).

Who uses common deployment?

- **Business events**
  - Event specification file
  - Dispatch adapter specification file
- **WODM**
  - Endpoint group descriptor
  - TPF data model descriptor
  - WODM RuleApp descriptor

Common deployment rules

- **Deployment descriptors must be loaded to the system using the TPF loader (OLDR or TLDR).**
  - IBM delivered files are specified in control file
    - base/cntl/tpf.loadfile
- **A unique file extension must be used on the deployment descriptor.**
  - Used to identify the function (or application)
  - Comprised of "*.function_unique_name*.xml"
    - Business event specification is: ".evspec.xml"
    - Business event dispatch adapter specification is: ".evda.xml"
- **On z/TPF system deployment descriptors must be in directory**
  - /sys/tpf_pbfiles/tpf-fdes/.

Common deployment conventions

- **File extension is part of the name of the schema.**
  - The name of the schema must be tpf-*file_extension*.xsd.
- **On linux IBM delivered schema are in relative directory**
  - base/tpf-fdes/schema/.
- **On z/TPF the schema are in directory**
  - /sys/tpf_pbfiles/tpf-fdes/schema/.

How to control a deployment descriptor

- **Deploy**
  - ZMDES DEPLOY FILE-file_name
  - ZMDES DEPLOY FILE-file_name IPROC-x
- **Undeploy**
  - ZMDES UNDEPLOY FILE-file_name
  - ZMDES UNDEPLOY FILE-file_name IPROC-x
- **Display status**
  - ZMDES DISPLAY

Common deployment file system usage

- **Files loaded to the system using ZOLDR or ZTPLD**
  - Configuration File
    - /sys/tpf_pbfiles/tpf-fdes/fdes-config.csv
  - Deployment descriptors must be in directory:
    - /sys/tpf_pbfiles/tpf-fdes/
  - By convention schemas are put in directory:
    - /sys/tpf_pbfiles/tpf-fdes/schema/
- **Non-loaded file:**
  - Status file
    - /etc/tpf-fdes/.status_X where X is the CPUID of the processor

Common deployment configuration file

- **Identify each function that uses common deployment**
- **On linux, relative directory is:**
  - base/tpf-fdes/fdes-config.csv
- **On z/TPF, absolute directory is:**
  - /sys/tpf_pbfiles/tpf-fdes/fdes-config.csv
- **Contents**
  - Column 1: File extension (e.g. evspec.xml)
  - Column 2: 4-character program name that does function unique processing
  - Column 3: Auto-deploy indicator (e.g. Yes, means that a function descriptor will automatically be deployed when it is initially loaded_
  - Column 4: Permanently-deploy indicator (e.g. Yes means that a function descriptor can never be undeployed)

Function unique processing program

- **Common deployment cannot do some work for a deployment descriptor.**
- **Function unique processing program does this work**
- **Three actions:**
  - Build the in memory structure
    - Called by restart and ZOLDR ACT
    - Do XML parsing
    - Obtain system heap to keep results from parsing
    - System heap must have a standard header
  - Processing on cycle to norm
  - Clean up processing
    - Called by EAT cleanup
    - Return system heap

Common Deployment locate an in-memory structure

- **Use C function: tpf_fdes_find()**
- **Locates in-memory structure based on:**
  - Key (example: event name)
  - Type (example: event specification - BEVEVESTYPE)
  - Version
  - Activation number
- **Key, type, and version are supplied by the function unique processing program on return from the build option.**
  - Located in the standard header of the in-memory structure

The End

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