# z/OS 3.2 IBM Education Assistant

Solution Name:  z/OS BCPii V2 Asynchronous Requests Support

Solution Element(s):  5752SCHWI z/OS BCPii

July 2025

# Agenda

- Trademarks
- Objectives
- Overview
- Usage & Invocation
- Interactions & Dependencies
- Upgrade & Coexistence Considerations
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# Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.
- Additional Trademarks:
  - None.

# Objectives

- z/OS BCPii allows authorized applications to query, change, and perform procedures against the systems in the Process Control (HMC) Network

- With the addition of `HWIREST` Callable Service, z/OS BCPii increased the number of capabilities available to the user for managing CPCs in a REST-like Callable Service

- `HWIREST` Callable Service only handles synchronous requests for CPCs, preventing “V1” `HWIEVENT` Callable Service from moving to a REST-like Callable Service

- A new `HWIREST2` Callable Service offers the same capabilities of `HWIREST` while providing asynchronous event handling

# Overview

- Who (Audience)
  - Users of z/OS BCPii wanting to be notified of specific events from target systems along with the ability to monitor Hardware Management Consoles' (HMCs') asynchronous events.

- What (Solution)
  - `HWIREST2` Callable Service builds on the REST-like API of `HWIREST`, adding the ability to register for asynchronous events

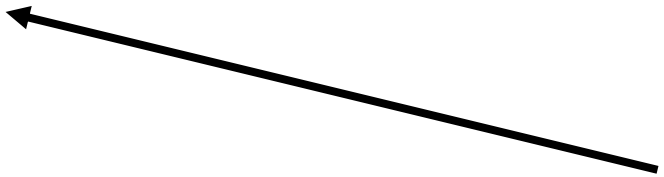
- Wow (Benefit / Value, Need Addressed)
  - More asynchronous events will be available to users, through a REST-like API, allowing the modernization and development of further automation and management programs

# Usage & Invocation (1 of 5)

```
HWIREST2(&request, &response);

REQUEST_REST2_PARM_TYPE request;
      request.httpMethod
      request.uri
      request.targetName
      request.requestBody
      request.clientCorrelator
      request.encoding
      request.requestTimeout
      request.eventExitMode
      request.eventExitAddr
      request.eventExitParm

RESPONSE_PARM_TYPE response;
      response.responseDate
      response.requestId
      response.location
      response.responseBody
      response.httpStatus
      response.reasonCode
```



Event exit parameters like `HWIEVENT`

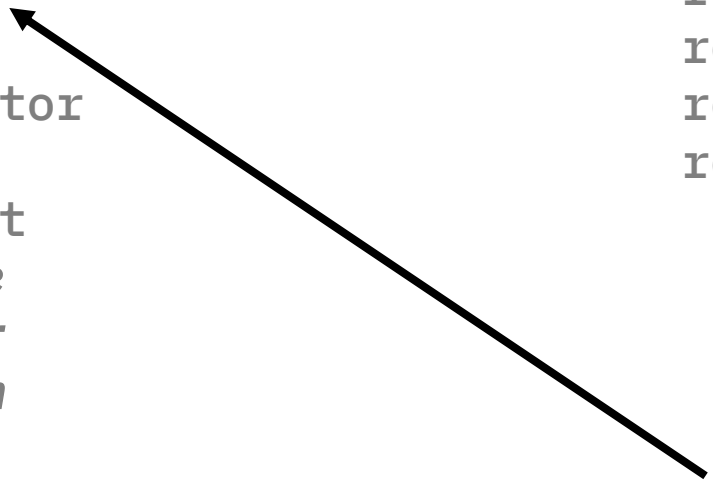
*note*: `HWIREST2` always uses JWTs so JWTs must be configured

# Usage & Invocation (2 of 5)

```
HWIREST2(&request, &response);
```

```
REQUEST_REST2_PARM_TYPE request;
      request.httpMethod
      request.uri
      request.targetName
      request.requestBody
      request.clientCorrelator
      request.encoding
      request.requestTimeout
      request.eventExitMode
      request.eventExitAddr
      request.eventExitParm
```

```
RESPONSE_PARM_TYPE response;
      response.responseDate
      response.requestId
      response.location
      response.responseBody
      response.httpStatus
      response.reasonCode
```



Supports either CPC or HMC targets

HMC target format is `HMC://hmcname`

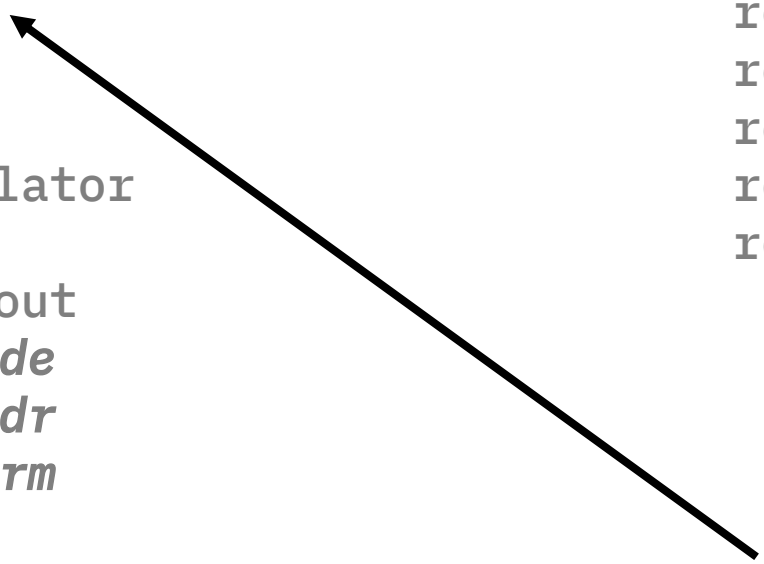
*note*: `HWIREST2` always uses JWTs so JWTs must be configured

# Usage & Invocation (3 of 5)

```
HWIREST2(&request, &response);

REQUEST_REST2_PARM_TYPE request;
      request.httpMethod
      request.uri
      request.targetName
      request.requestBody
      request.clientCorrelator
      request.encoding
      request.requestTimeout
      request.eventExitMode
      request.eventExitAddr
      request.eventExitParm

RESPONSE_PARM_TYPE response;
      response.responseDate
      response.requestId
      response.location
      response.responseBody
      response.httpStatus
      response.reasonCode
```



4 New Async Related URIs are supported

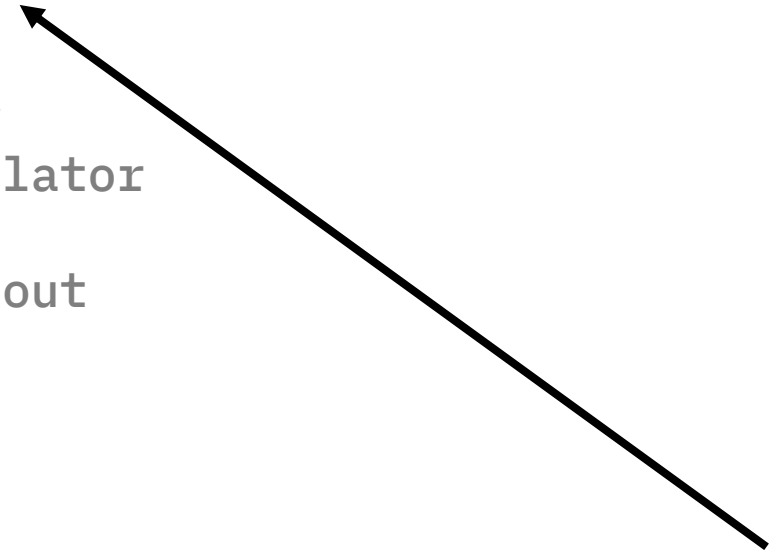
```
POST /api/sessions/operations/register-for-notifications
POST /api/sessions/operations/update-notifications-registration
POST /api/sessions/operations/delete-notifications-registration
GET  /api/sessions/operations/get-notifications-registrations
```

# Usage & Invocation (4 of 5)

```
HWIREST(&request, &response);

REQUEST_REST_PARM_TYPE request;
      request.httpMethod
      request.uri
      request.targetName
      request.requestBody
      request.clientCorrelator
      request.encoding
      request.requestTimeout

RESPONSE_PARM_TYPE response;
      response.responseDate
      response.requestId
      response.location
      response.responseBody
      response.httpStatus
      response.reasonCode
```

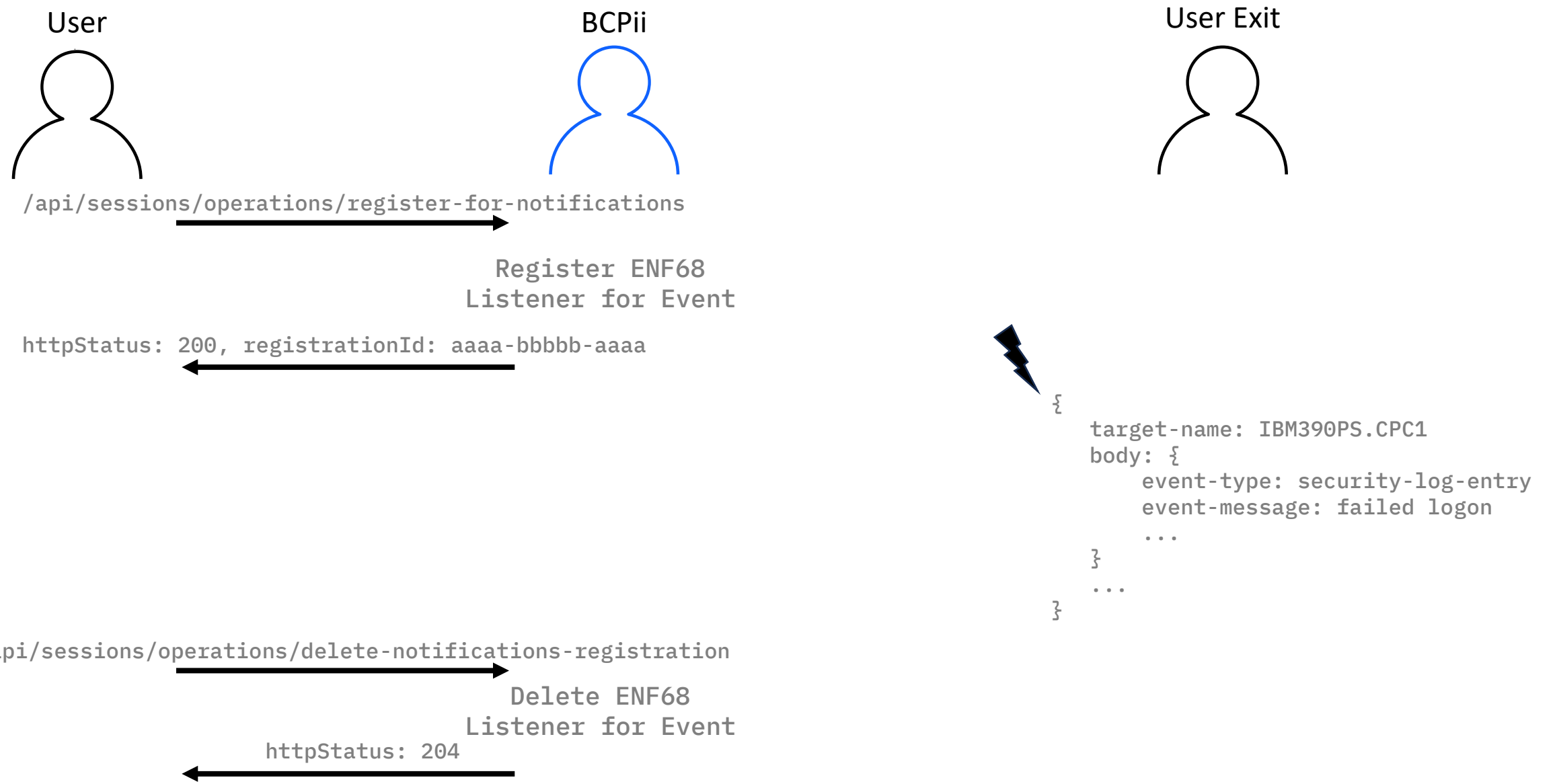


Using HWIREST will not configure an Exit on the caller's behalf, they must manually register for their ENF68 Event, or monitor / poll it otherwise

4 New Async Related URIs are supported

```
POST /api/sessions/operations/register-for-notifications
POST /api/sessions/operations/update-notifications-registration
POST /api/sessions/operations/delete-notifications-registration
GET  /api/sessions/operations/get-notifications-registrations
```

# Usage & Invocation (5 of 5)



# Interactions & Dependencies

- Software Dependencies
  - None.
- Hardware Dependencies
  - IBM z17 System is required for JWT Authorizations.
  - IBM Crypto Express Card is required for JWT Authorizations.
- Exploiters
  - None.

# Upgrade & Coexistence Considerations

- To exploit this solution, all systems in the Plex must be at the new z/OS level:  No
- No toleration/coexistence APARs/PTFs.

# Installation & Configuration

- Available on z/OS 3.1 with OA65929

- Available in z/OS 3.2 Base

*Needed for JWTs required for* `HWIREST2` *and async URIs:*

- Generate a BCPii Authorization Certificate in a Security Product
- Export and Upload of the BCPii Authorization Certificate to the targeting or managing HMC
- Configuration of a JWT Mapping for the User associated with the BCPii Started Task on the targeting or managing HMC
  - Additionally, any z/OS Users issuing JWT `HWIREST` or `HWIREST2` requests will need a mapping defined on the targeting or managing HMC

# Summary

- HWIREST2 offers extended functionality of HWIREST while always using JWTs and supporting Asynchronous Events
  - Asynchronous event bodies are in JSON structures when registered through HWIREST or HWIREST2

- z/OS BCPii will register an asynchronous event exit on the caller's behalf using HWIREST2 like HWIEVENT, but callers can also register their own if they desire

- An increased number of asynchronous events from CPCs or HMCs can now be registered for through z/OS BCPii

- Remaining "V1" tasks done through HWIEVENT now have a REST-like alternative

# Appendix

Publications

- **z/OS MVS Programming: Callable Services for High-Level Languages**
  - Complete z/OS BCPii documentation
- **z/OS MVS System Messages, Volume 6 (GOS – IEA)**
  - z/OS BCPii (HWI) message documentation
- **z/OS MVS System Codes**
  - z/OS BCPii abend ’042’x documentation
- **z/OS MVS Programming: Authorized Assembler Services Reference (EDT-IXG)**
  - z/OS BCPii ENF68 Event
- **z/OS MVS System Commands**
  - z/OS BCPii MVS Commands
- **Hardware Management Console Web Services API**
  - Firmware Publication for REST APIs

Additional samples for z/OS BCPii are provided via GitHub

- https://github.com/IBM/zOS-BCPii