

## IMS Callout Techniques

A 3D graphic featuring the word "Smart" in a white, cursive script font, positioned above the letters "SOA" which are rendered in large, blue, blocky 3D characters. The entire graphic is set against a dark blue background with a grid pattern on the floor and a light blue glow behind the text.

Haley Fung  
IMS Senior Developer

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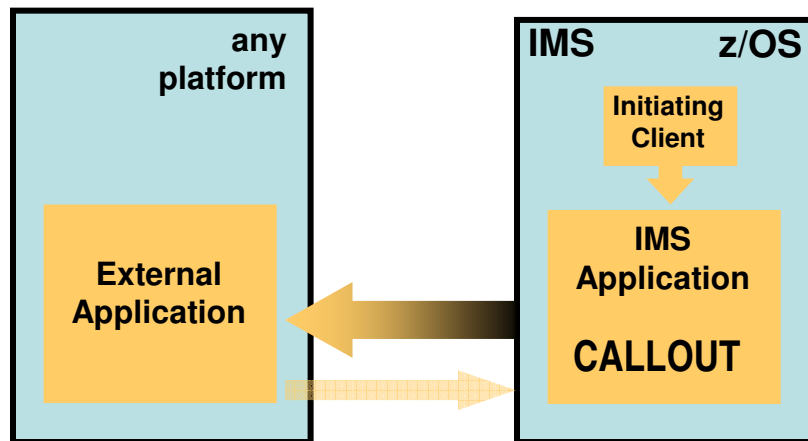
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# Agenda

- IMS Callout techniques
  - DL/I ISRT ALTPCB
  - DL/I ICAL
  - CPI-C/APPC calls
  - TCP/IP sockets calls
  - WebSphere MQ calls
  - SQL calls to DB2 stored procedures

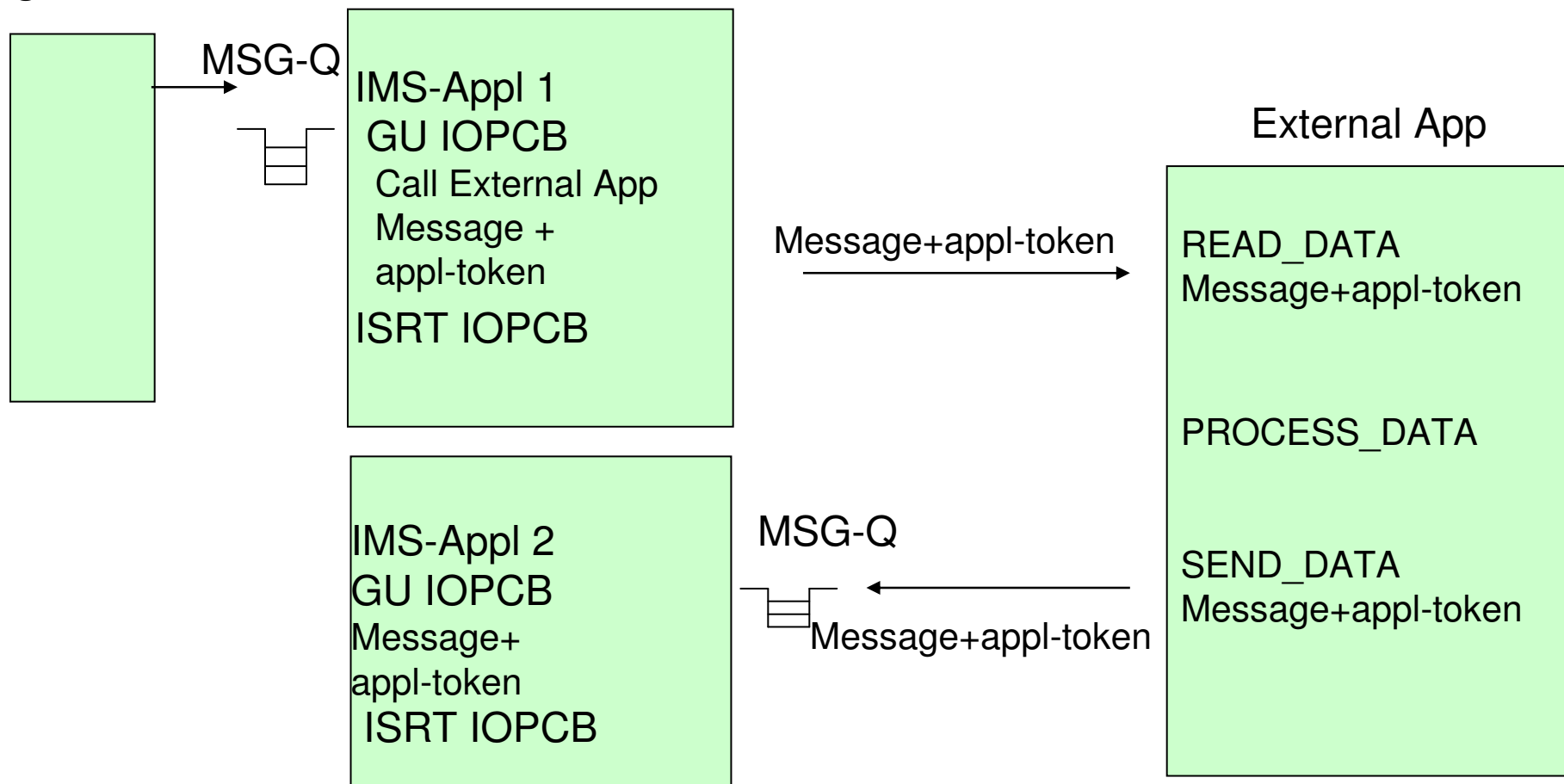
## IMS as Integration Focal Point



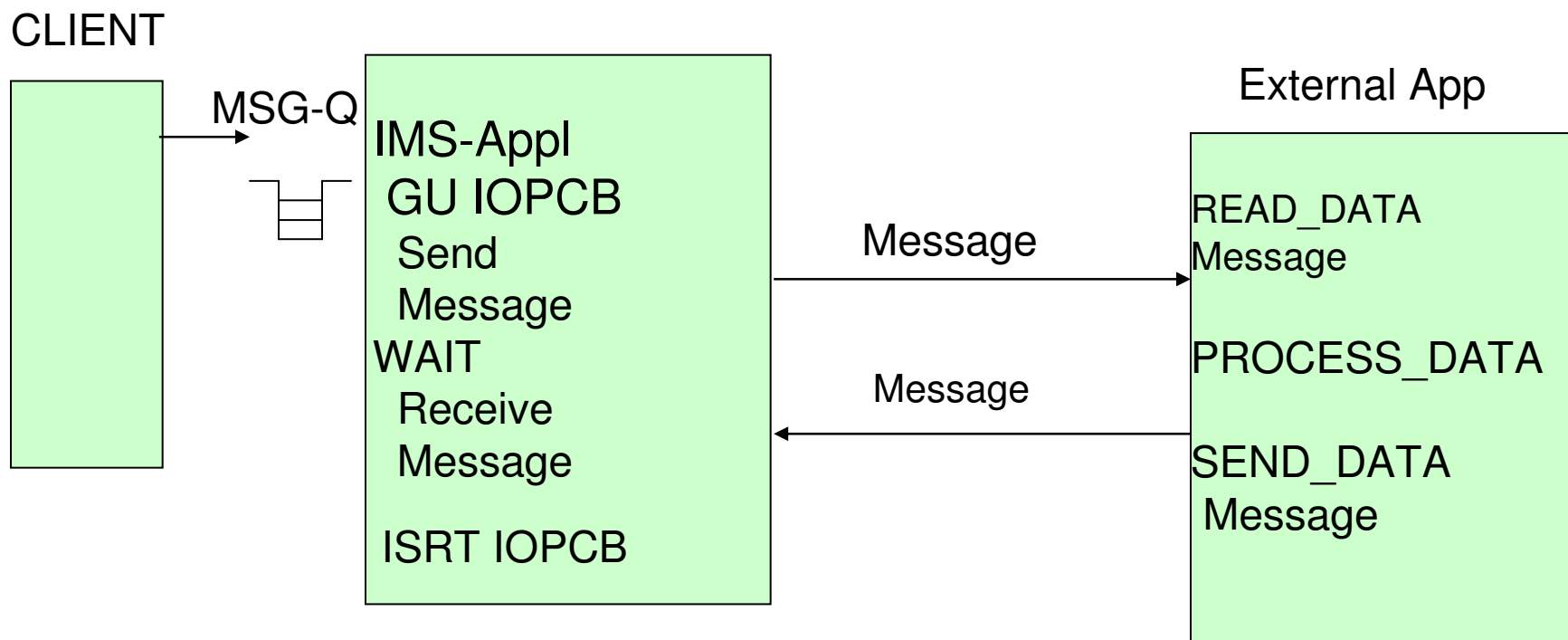
- IMS applications can access other environments and data
- Enables IMS applications as clients to interoperate with applications and servers
  - Better integration of IMS applications for SOA and Web Services
- Maximizes re-use of IMS applications for rapid business innovation and reduced costs

# Review - Asynchronous Model

CLIENT



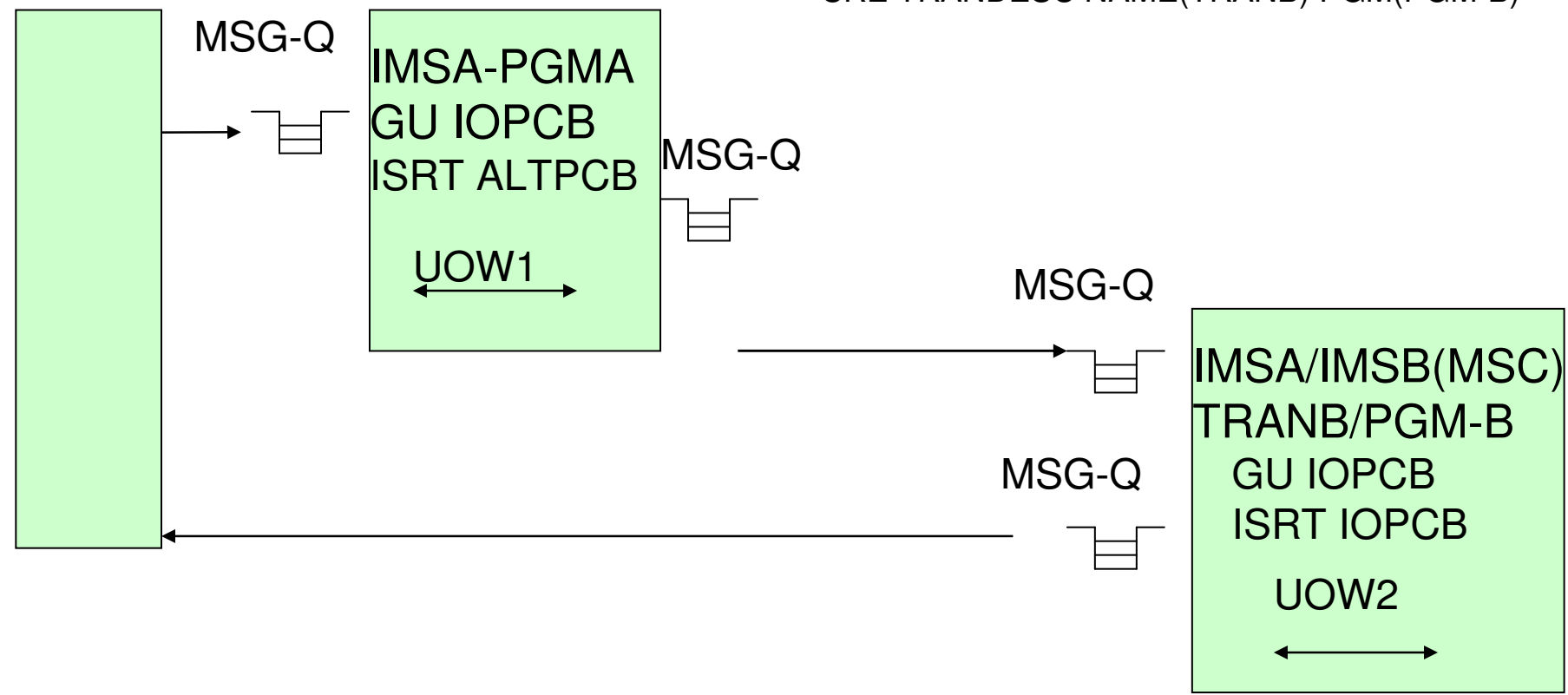
# Review - Synchronous Model



# IMS DL/I ISRT ALTPCB Asynchronous Callout

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TRANCODE – Dynamic Resource Descriptor/DFSINSX0  
 CRE TRANDESC NAME(TRANB) PGM(PGM-B)



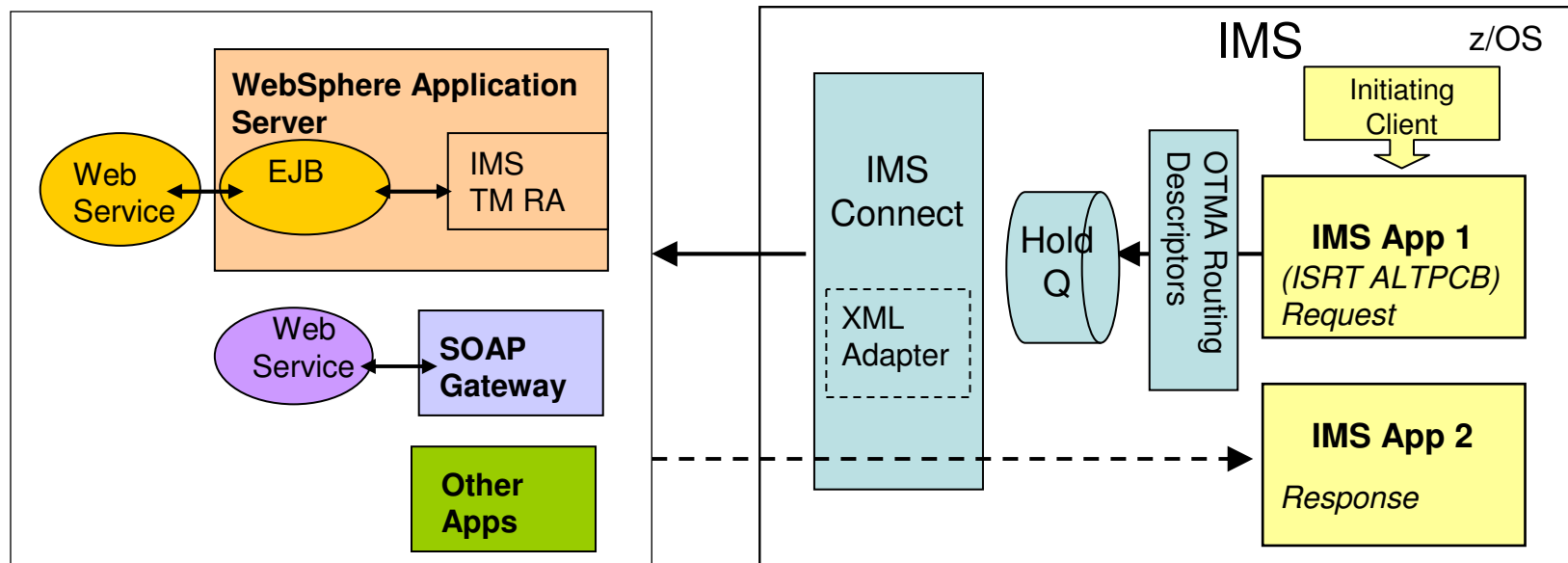
# IMS DL/I ISRT ALTPCB Asynchronous Callout

- IMS DL/I API call
- Provides program-to-program communication
- Applications need to know each other
- IMS only supports asynchronous communication
  - ALTPCB
  - Applications manage response correlation
- No coordinated commit



# IMS 10 - Asynchronous Callout

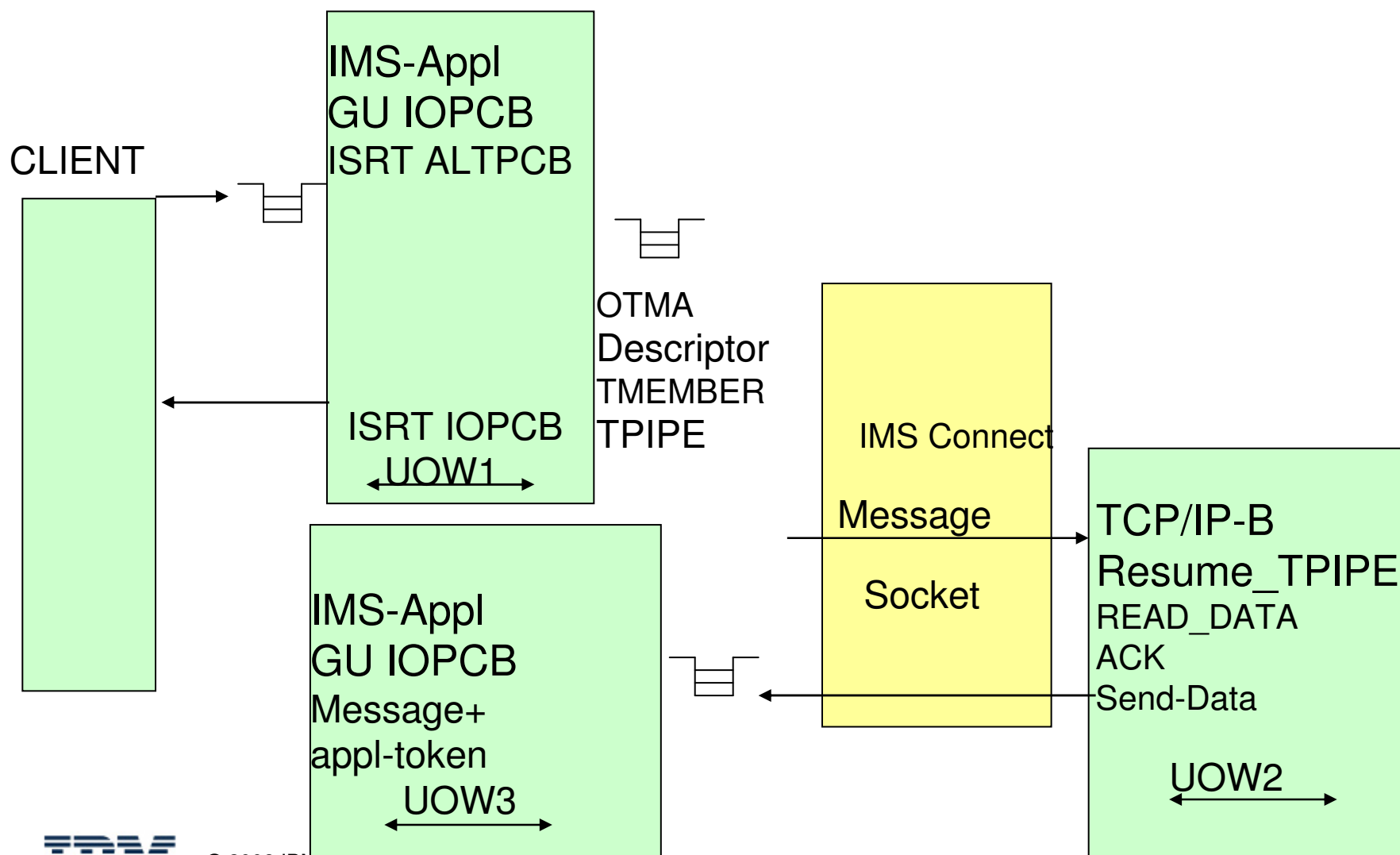
- **Enables IMS application to act as a client to asynchronously invoke J2EE applications and Web Services**
  - Callout to J2EE apps (e.g. EJB) and Web Services using WebSphere Application Server and IMS TM resource adapter
  - Callout to Web services using IMS SOAP Gateway
  - Callout to other apps



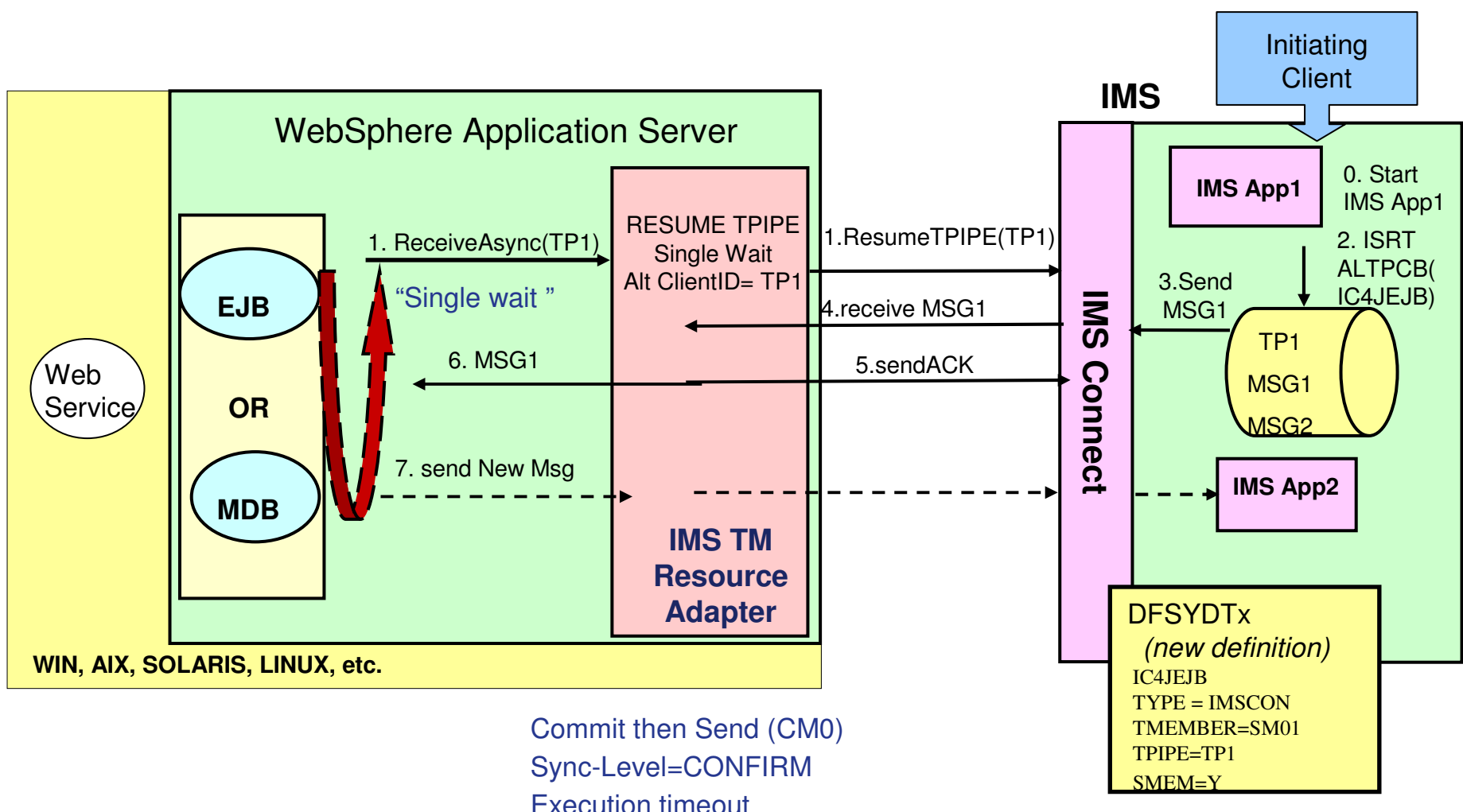
# IMS 10 OTMA Descriptors

- **DFSYDTx member of IMS.PROCLIB**
  - TYPE: Destination type
  - TMEMBER: OTMA Target Client
  - TPIPE: Destination Name
  - SMEM: Supermember name
  - ADAPTER: Type of IMS Connect Adapter
  - CONVERTR: Routine called by Adapter

# IMS Asynchronous Callout via OTMA IMS Connect

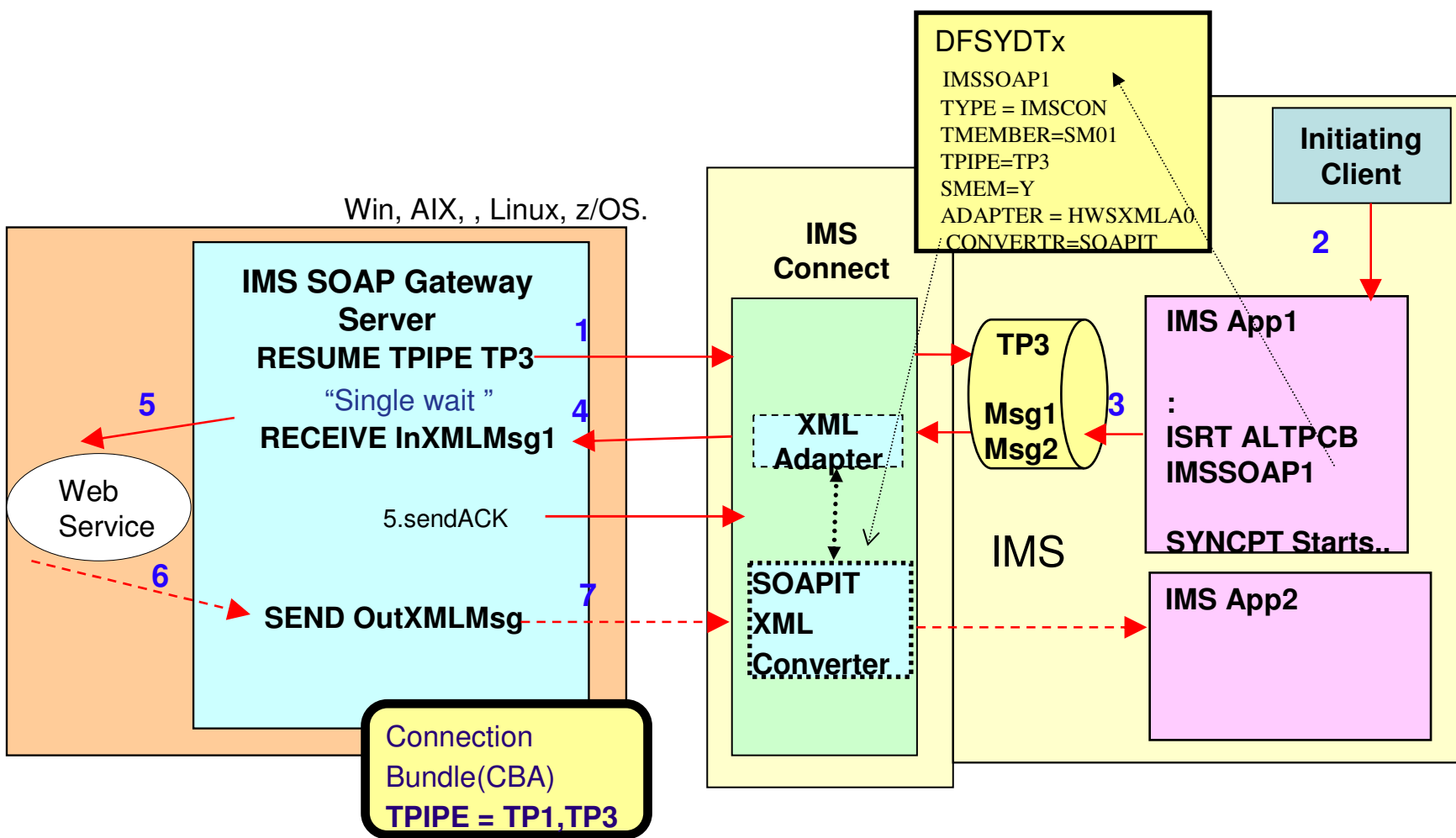


# IMS 10 Asynchronous Callout via IMS TM Resource Adapter



Commit then Send (CM0)  
Sync-Level=CONFIRM  
Execution timeout

# IMS 10 Asynchronous Callout via IMS SOAP Gateway

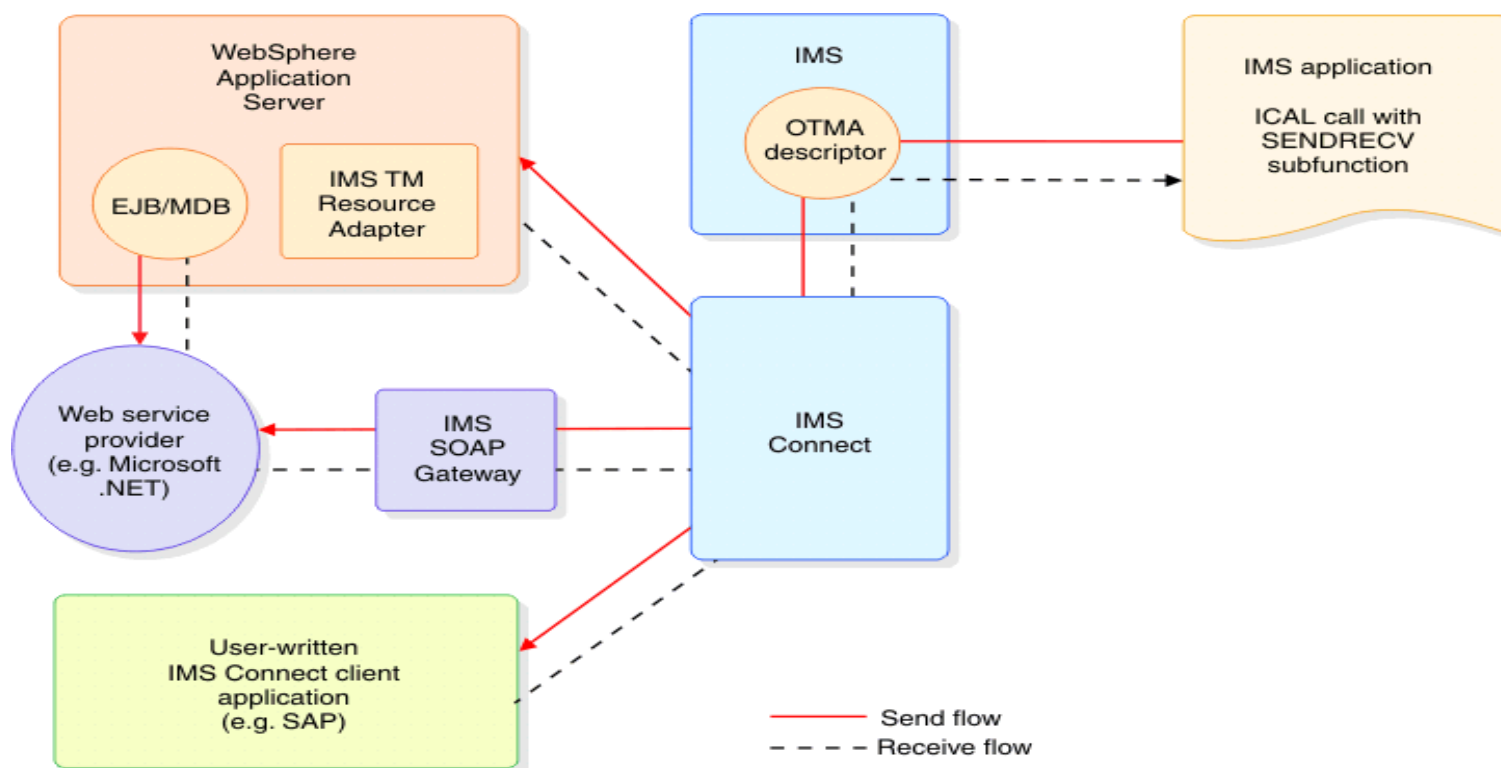


## IMS 10 Asynchronous Callout

- IMS DL/I API calls
- Provides for program-to-program communication
- IMS only supports asynchronous communication
  - ALTPCB
  - Applications manage response correlation
- Requires IMS Connect TCP/IP Client
- No distributed coordinated commit

## IMS 10 SPE – DL/I ICAL Synchronous Callout

- Enables IMS application to act as a client to invoke Web Services provider, Java EE (e.g. MDB/EJB) and RYO (e.g. SAP) applications
- Synchronously receive output back in the same IMS transaction instance



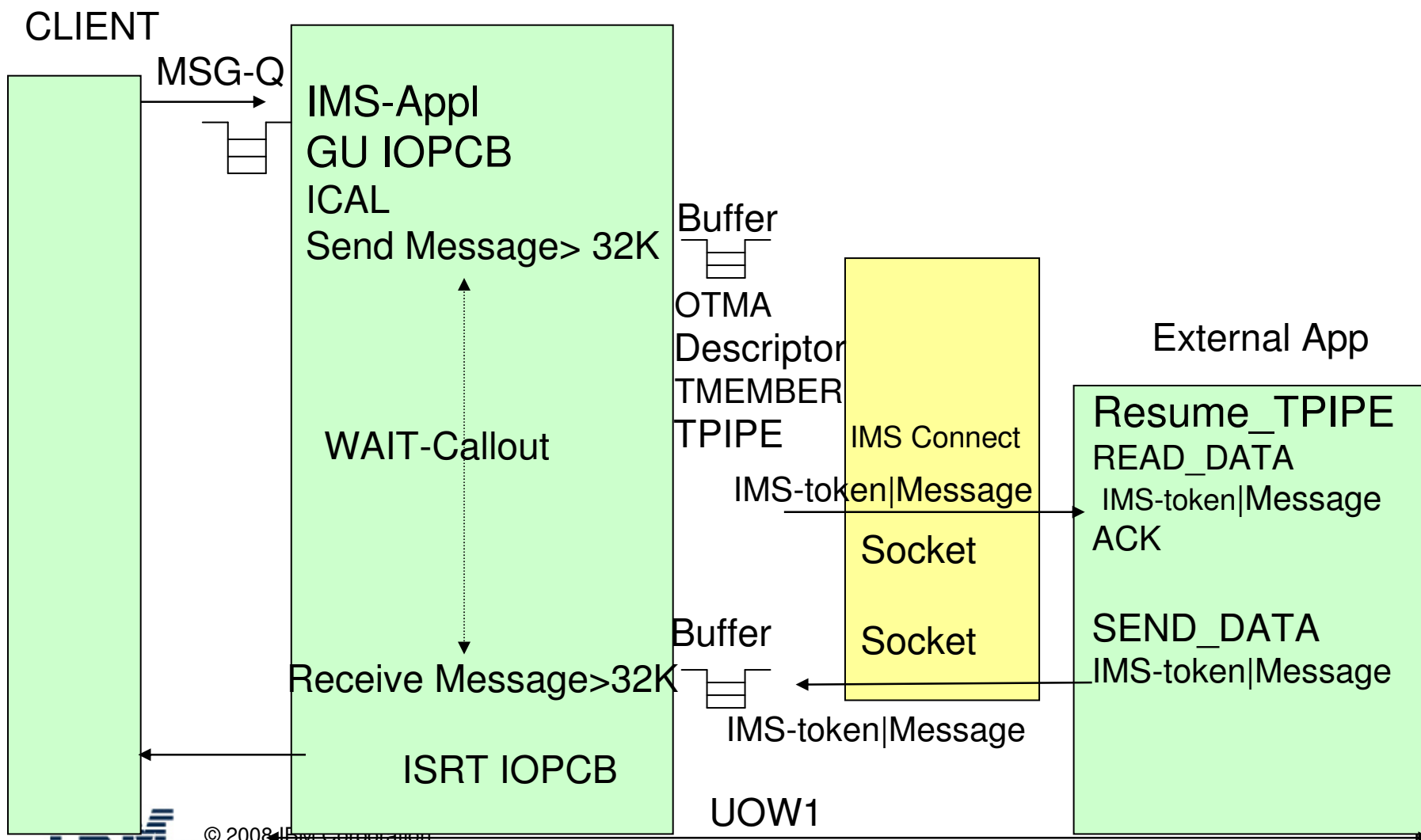
## Solution Highlights

- New DLI ICAL call for synchronous callout request
- Enhanced OTMA Resume TPIPE/Send Only protocol and Routing Descriptor function for retrieving synchronous callout requests and sending responses
- Provide management of the correlation of a synchronous callout request and response
- Enhanced IMS commands to view synchronous callout status and stop the callout processing
- Timeout support to optionally terminate callout request and free the dependent region
- Support messages larger than 32K without segmentation



# IMS 10 SPE - Synchronous Callout

IMS-token(CORTKN) - correlate response message to callout request message



# DL/I ICAL

## CALL 'AIBTDLI' USING ICAL, AIB, REQ-AREA, RESP-AREA.

*where:*

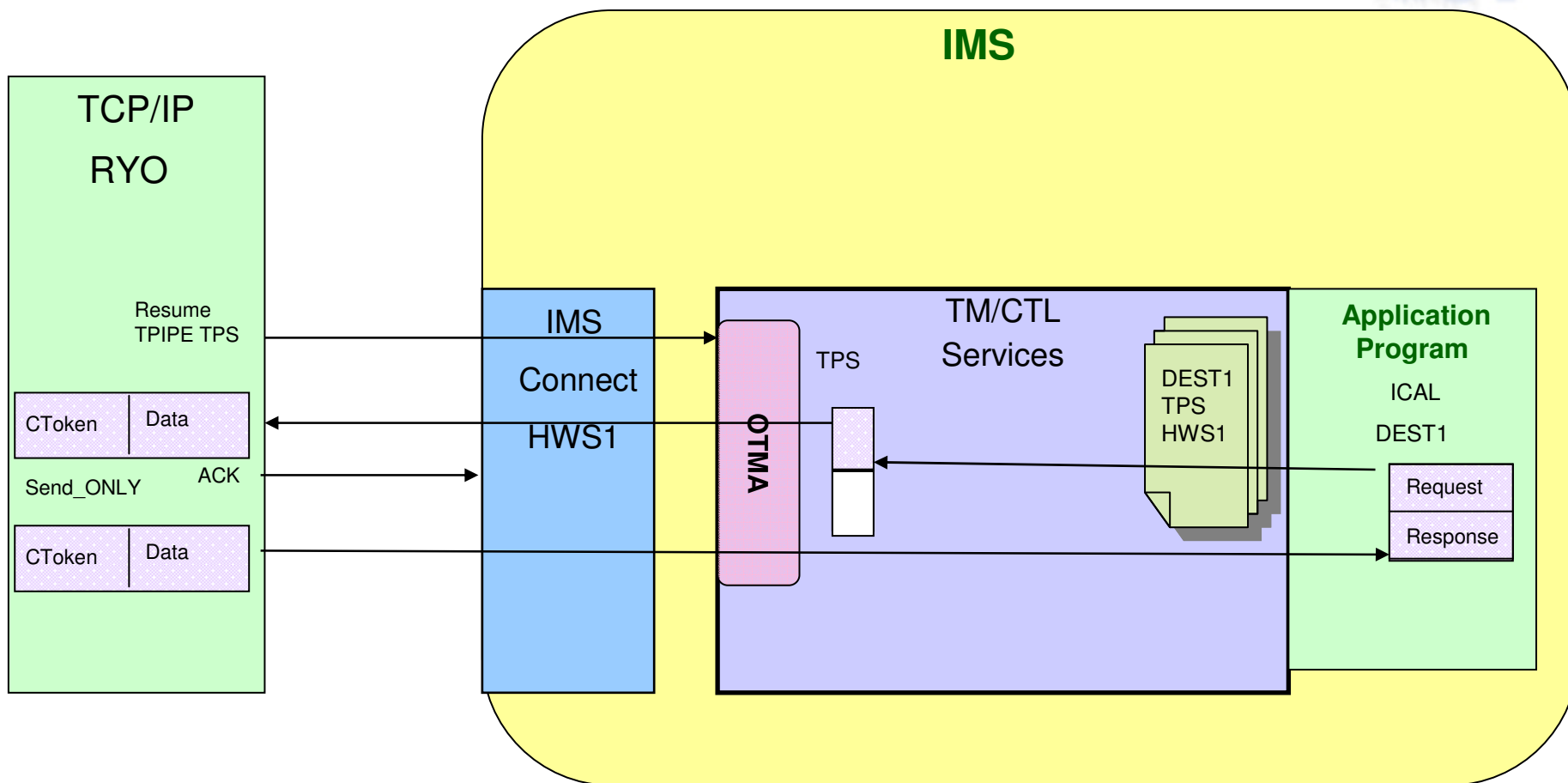
- ICAL is new call verb and SENDRECV is the new sub-function code
- REQ-AREA is the Request data area for sync callout
- RESP-AREA is the Response data area for returned data
- AIB
  - AIBSFUNC = SENDRECV
  - AIBRSNM1 = 8 byte OTMA Descriptor name
  - AIBRSFLD = Timeout value
  - AIBOALEN = Request area length
    - As an input parameter: 4 byte field contains the length of the request area
    - As an output parameter: Actual length of the response message updated by IMS only when partial data is returned (AIB return code x'100', AIB reason code x'00C').
  - AIBOAUSE = Response area length
    - As an input parameter: 4 byte field contains the length of the response area
    - As an output parameter: Length of the response message placed in the response area. When partial data is returned because the response area is not large enough, AIBOAUSE contains the length of data returned in the response area and AIBOALEN contains the actual length of the response message.

# Enhanced OTMA Destination Routing Descriptors

- **DFSYDTx member of IMS.PROCLIB**
  - TYPE: Destination type
  - TMEMBER: OTMA Target Client
  - TPIPE: Destination Name
  - SMEM: YES|NO
  - ADAPTER: Type of IMS Connect Adapter
  - CONVERTR: Routine called by Adapter
  - **SYNTIMER=timeout**
    - **Note ICAL overrides this value**

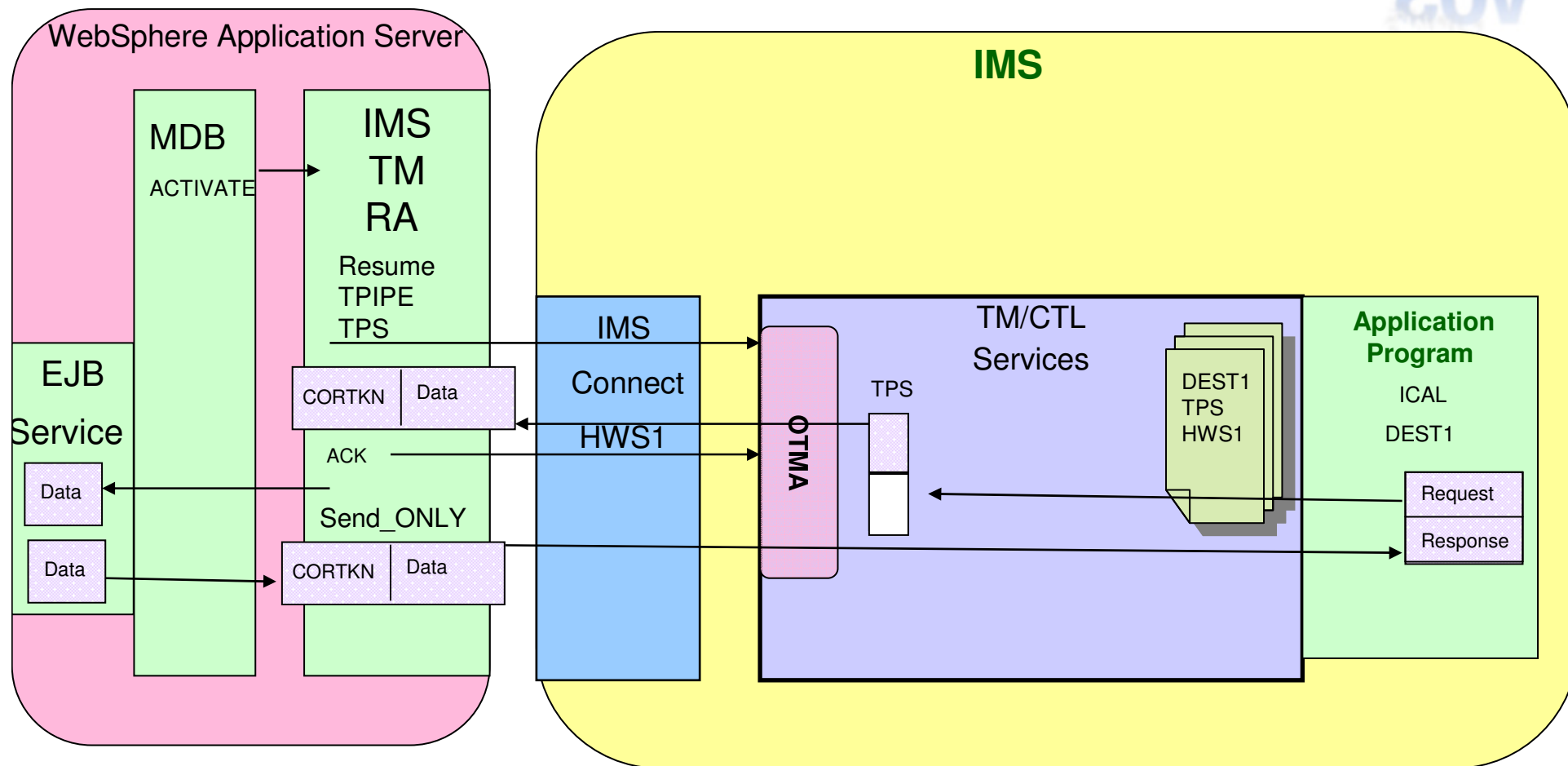
# IMS Synchronous Callout - RYO

z/OS

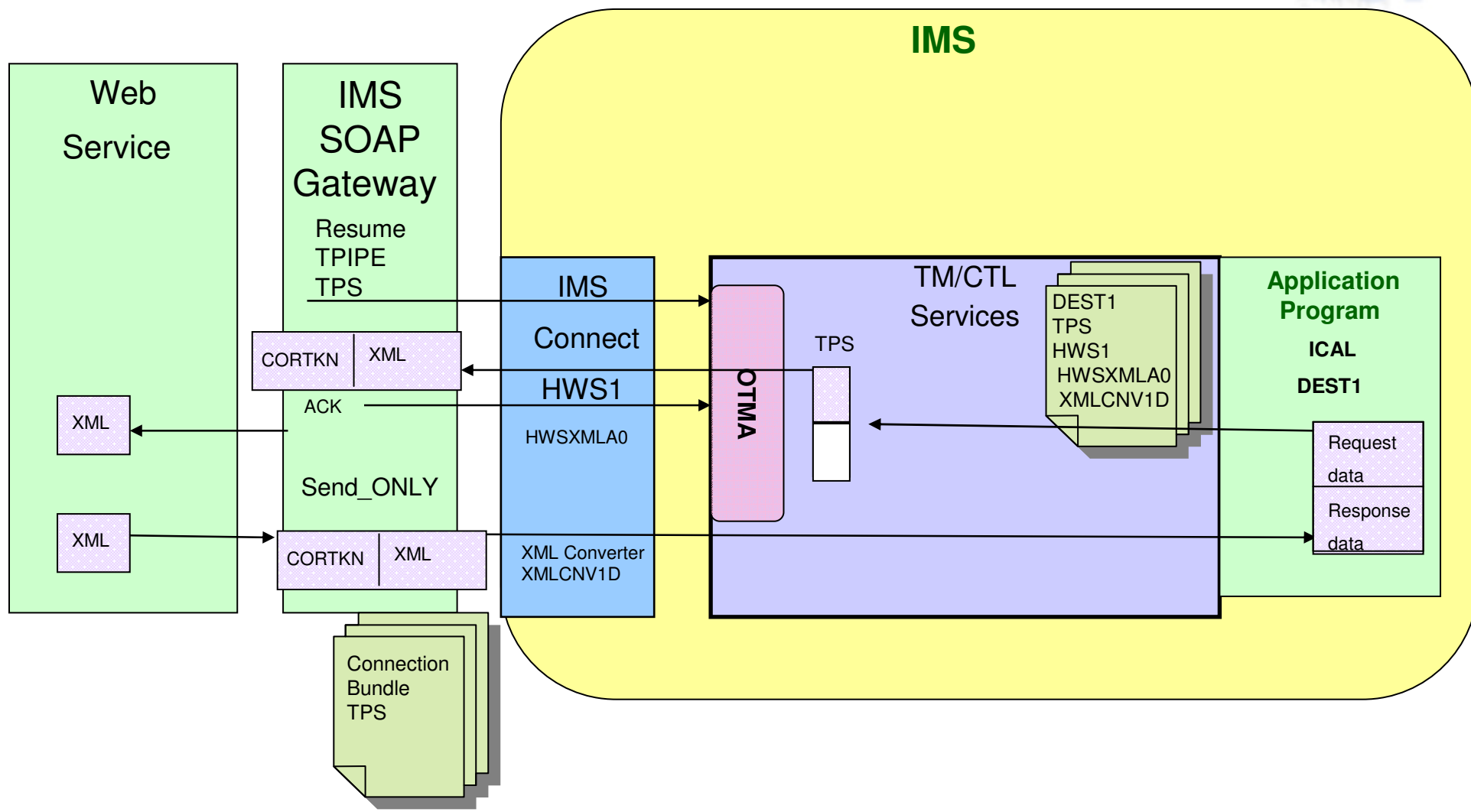


# IMS Synchronous Callout – IMS TM RA -MDB

z/OS



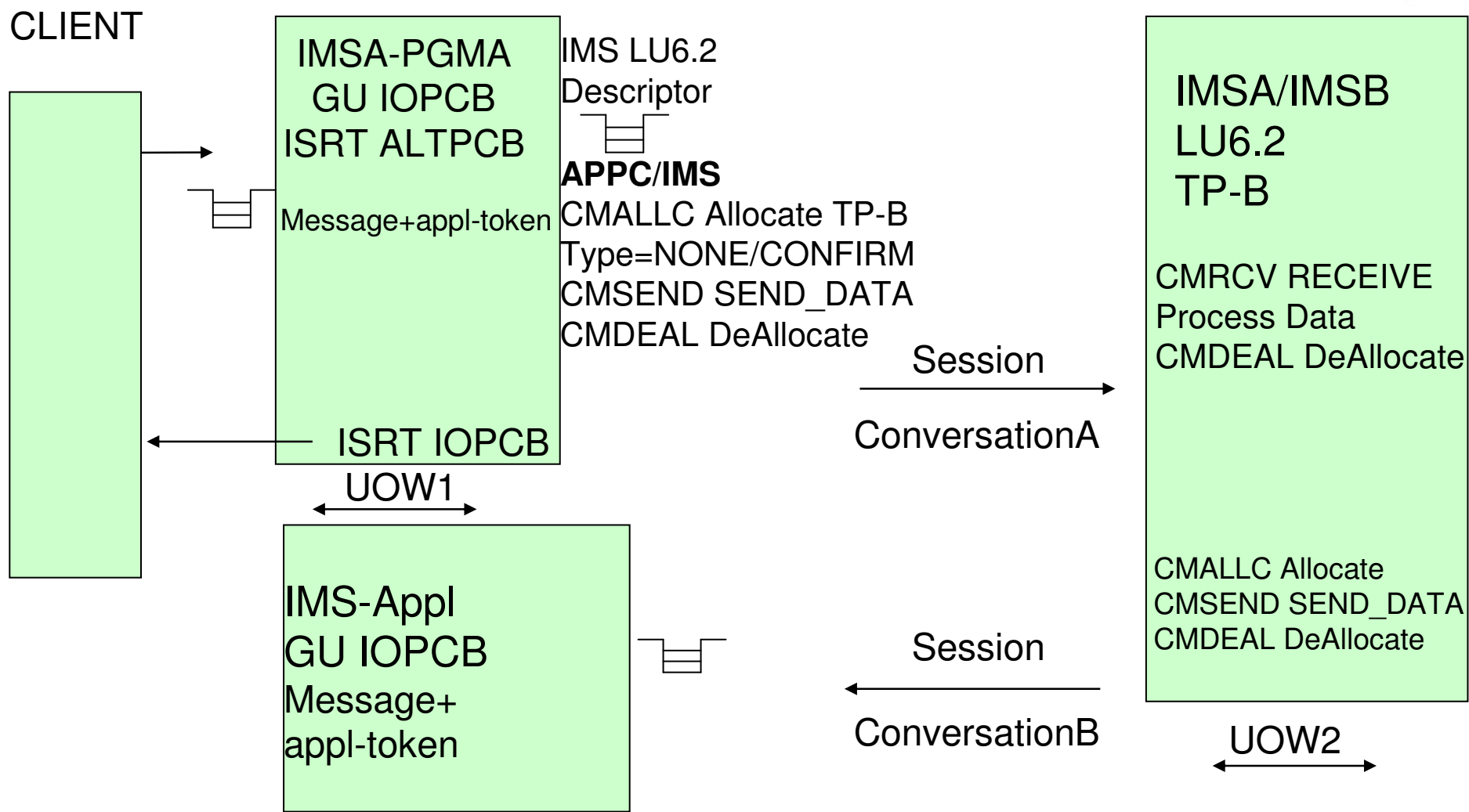
# IMS Synchronous Callout – IMS SOAP Gateway z/OS



## IMS 10 SPE – DL/I ICAL Synchronous Callout

- IMS DL/I API calls
- Provides for direct program-to-program communication
- Synchronous communication
  - IMS manages response correlation
- Requires IMS Connect TCP/IP Client
- No distributed coordinated commit

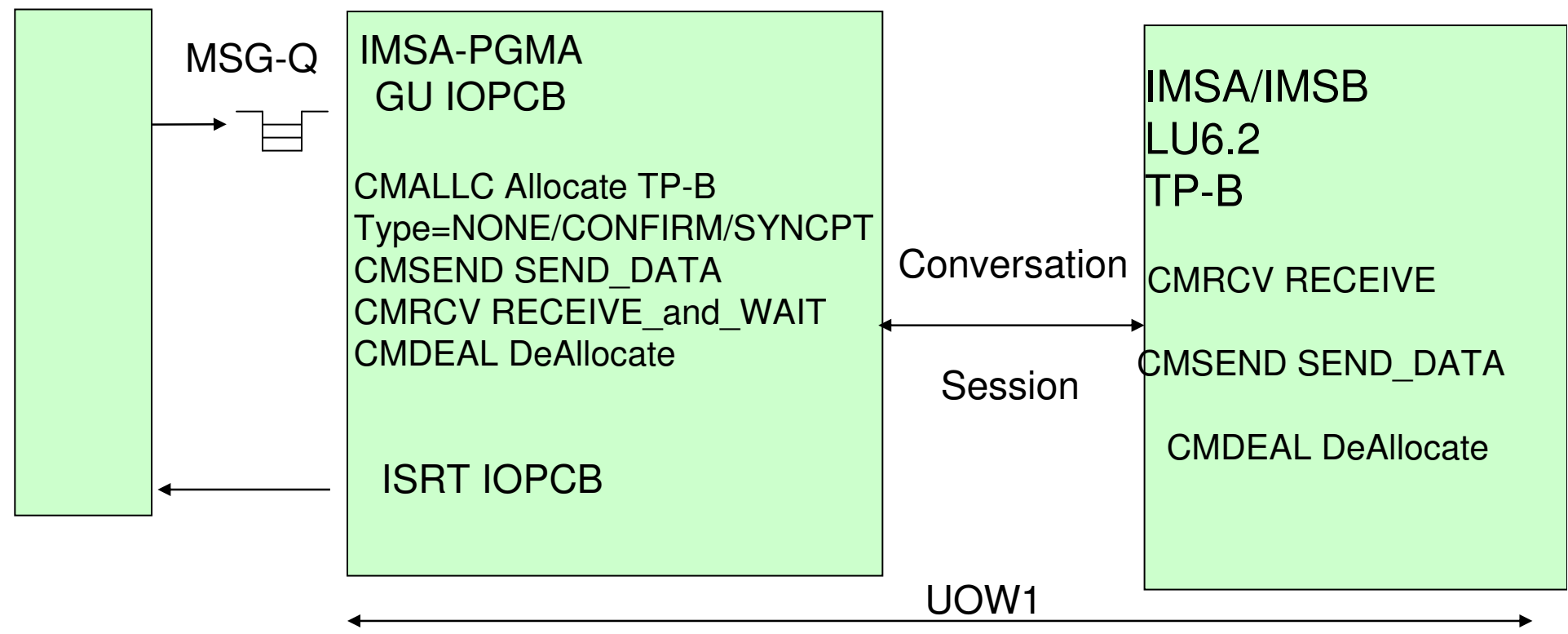
# APPC/IMS Asynchronous Callout





# CPI-C/APPC Synchronous Callout

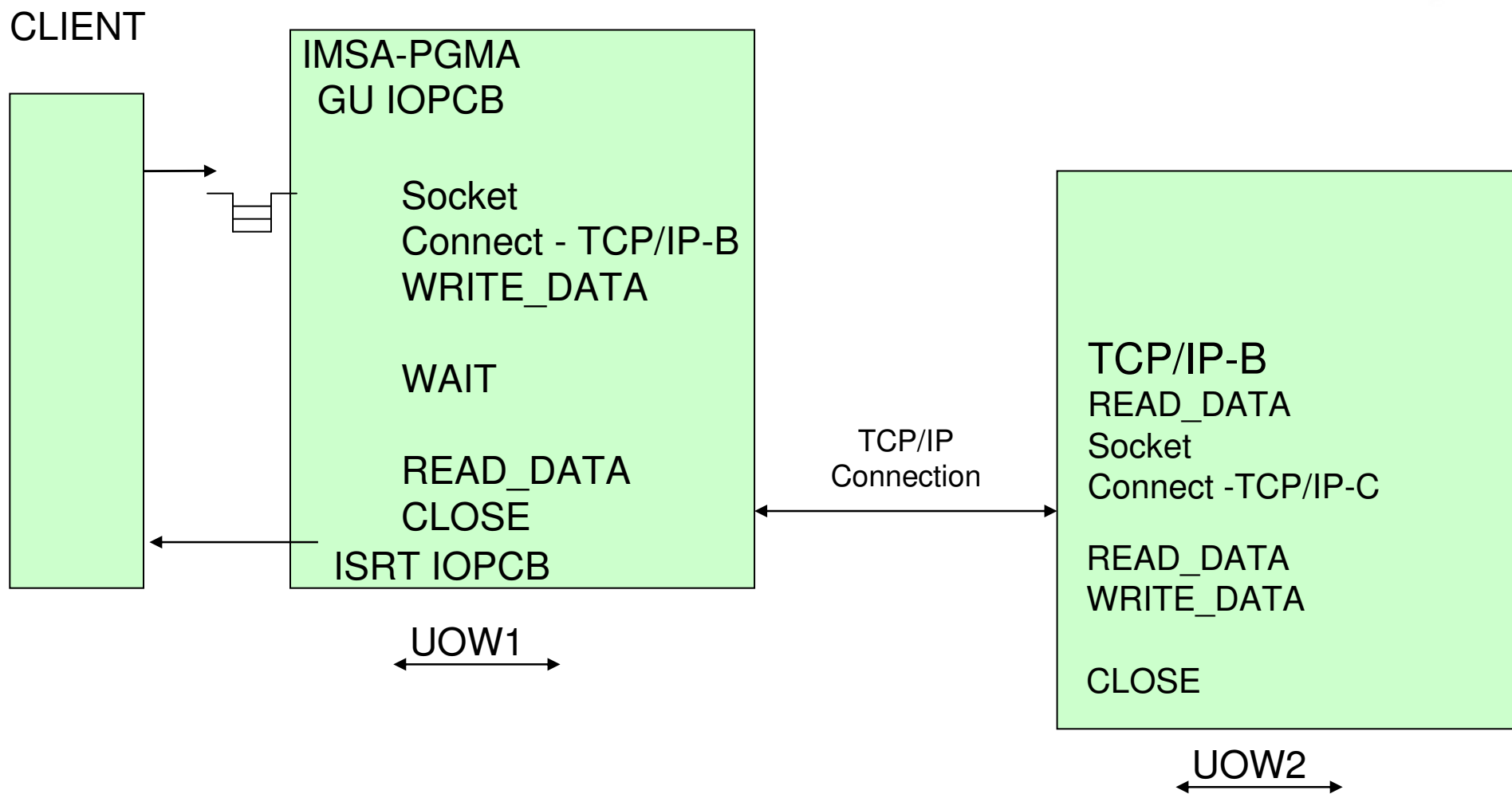
CLIENT



## CPI-C/APPC considerations

- Open Standards API calls
- Protocol for program-to-program communication
- IMS supports asynchronous and synchronous communication
  - Asynchronous
    - ALTPCB – IMS Allocates LU 6.2 conversation
    - Response requires application correlation
  - Synchronous
    - Can be single UOW or multiple UOWs
- Protocol supports distributed coordinated commit
- IMS participates in coordinated commit
  - Coordinator or participant via RRS
- Requires APPC partner

# TCP/IP Synchronous callout

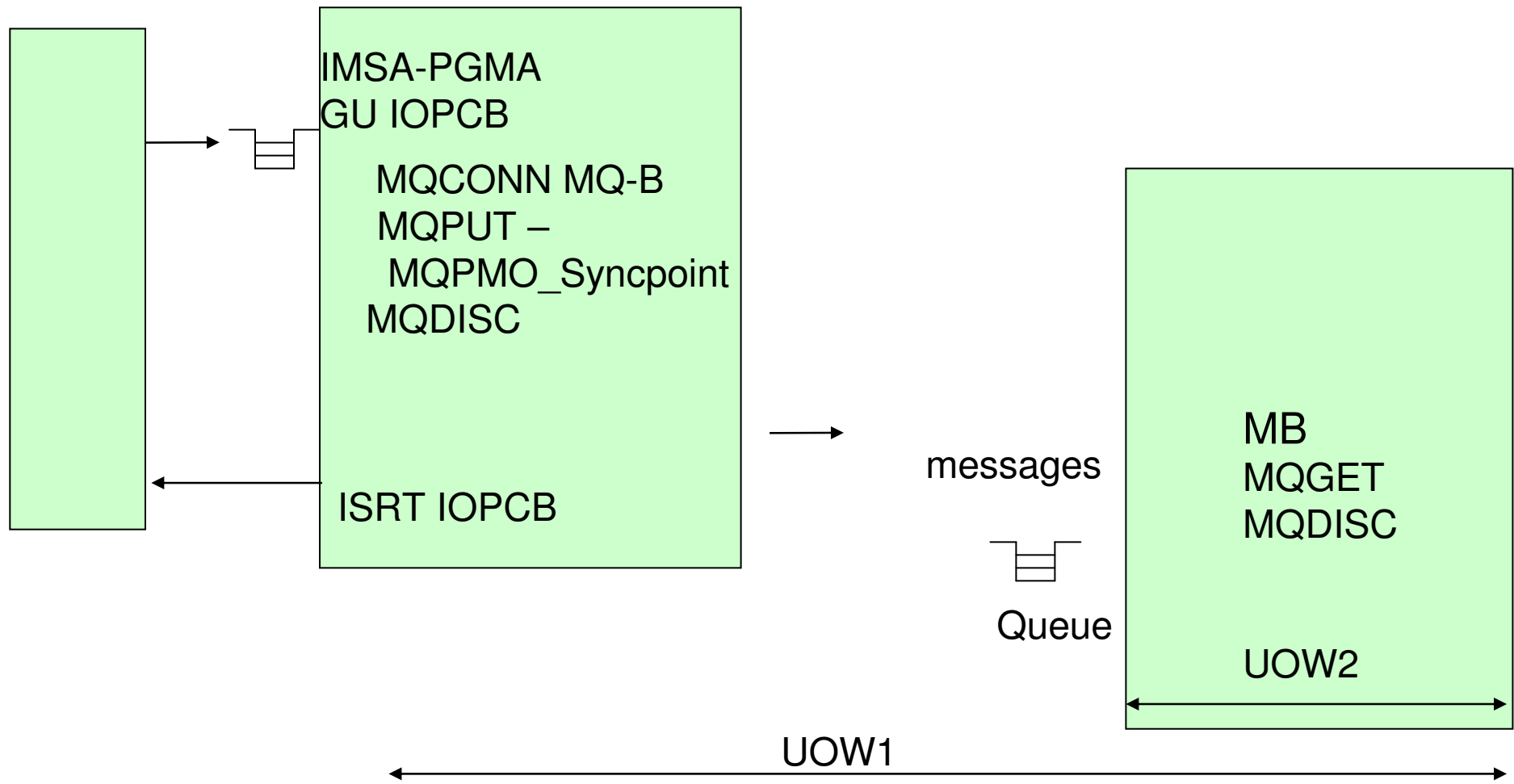


## TCP/IP Synchronous callout considerations

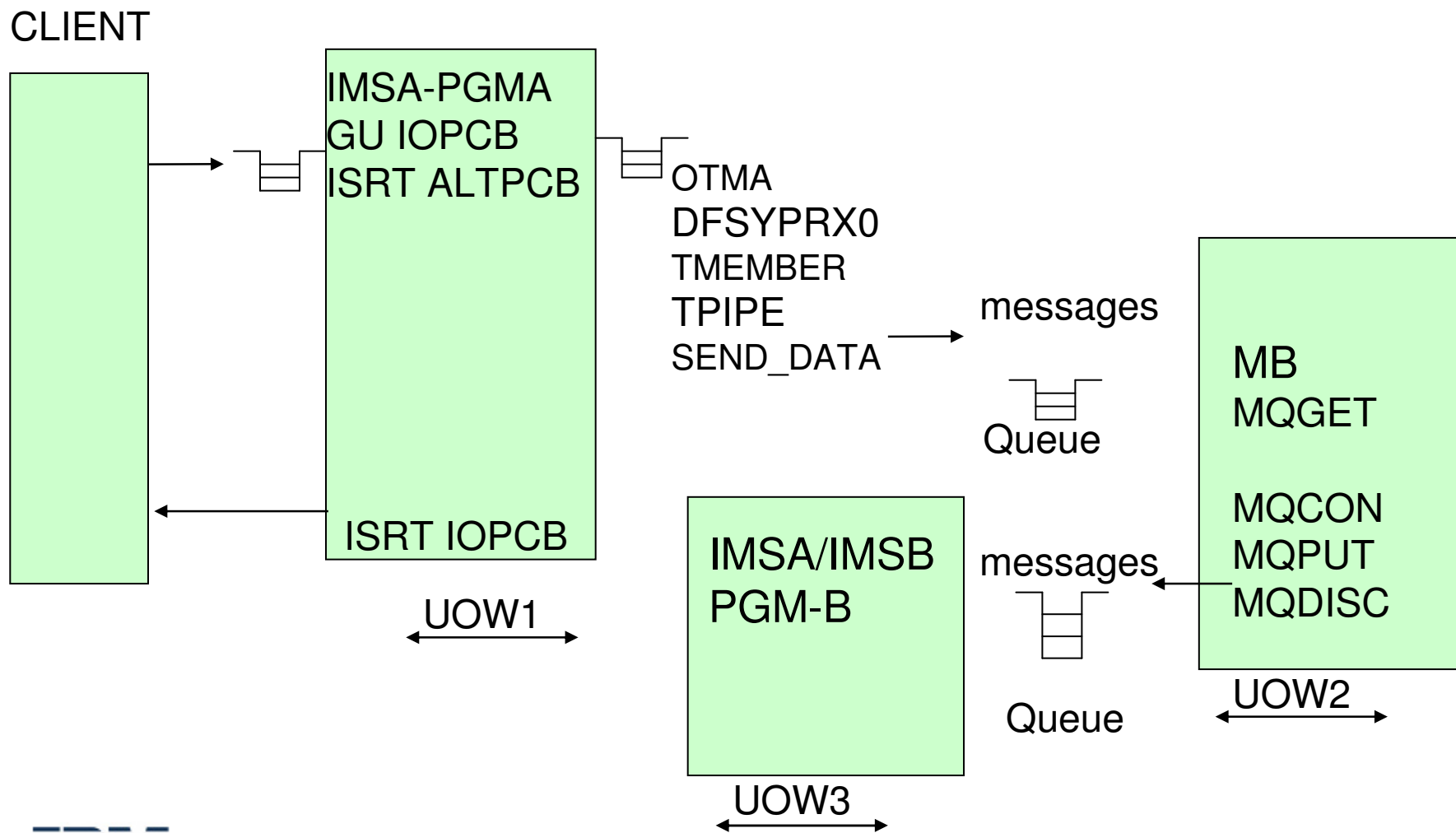
- Open Standards API calls
  - Can be used from various z/OS applications – COBOL, PL/I, Assembler, etc..
- Provides program-to-program communication
- Protocol does not support coordinated commit
  - IMS does not participate in coordinated commit
- Requires TCP/IP partner

# WebSphere MQ Asynchronous Callout via ESAF

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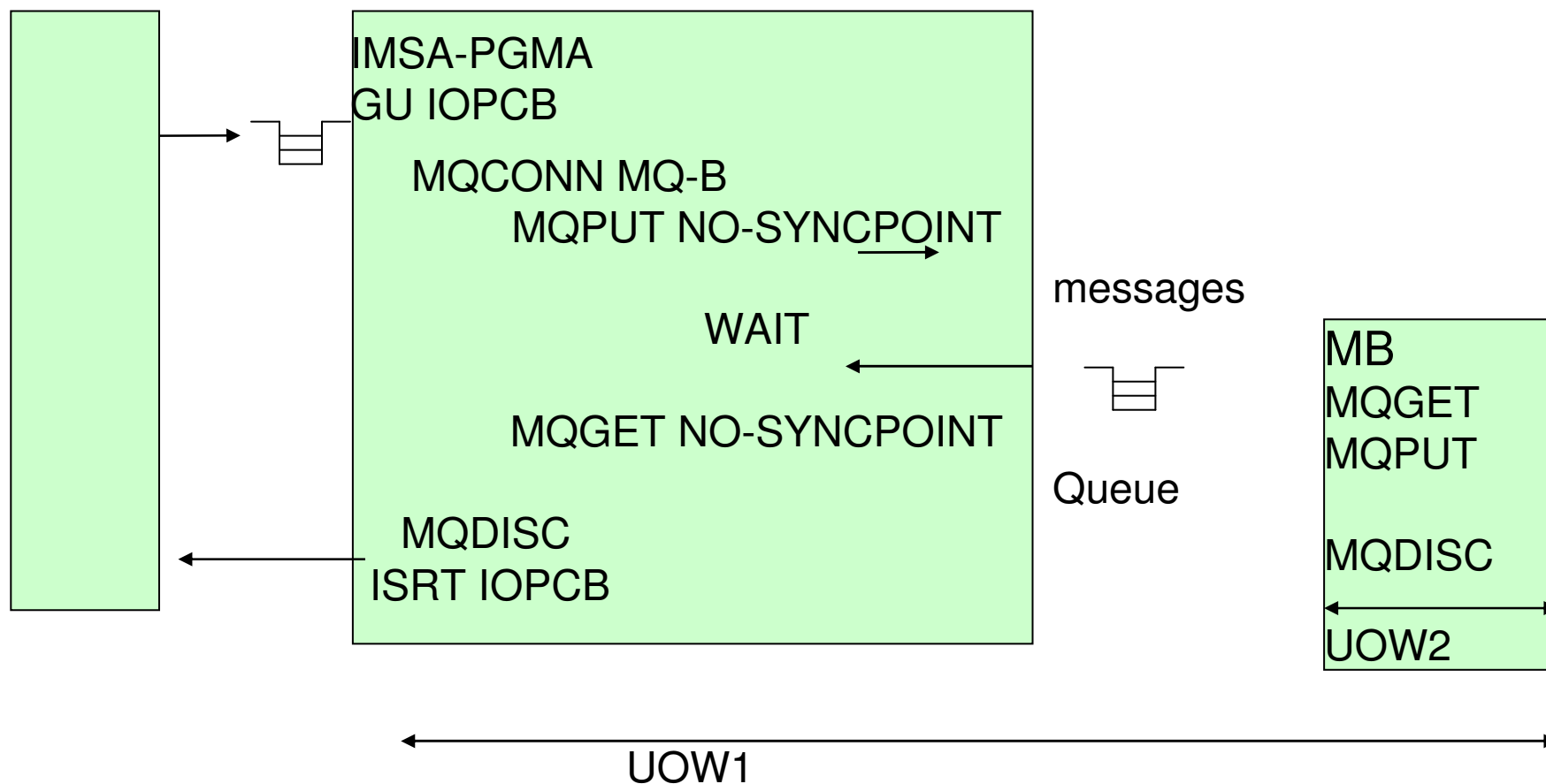


# WebSphere MQ Asynchronous callout via OTMA IMS Bridge



# WebSphere MQ Synchronous callout via ESAF

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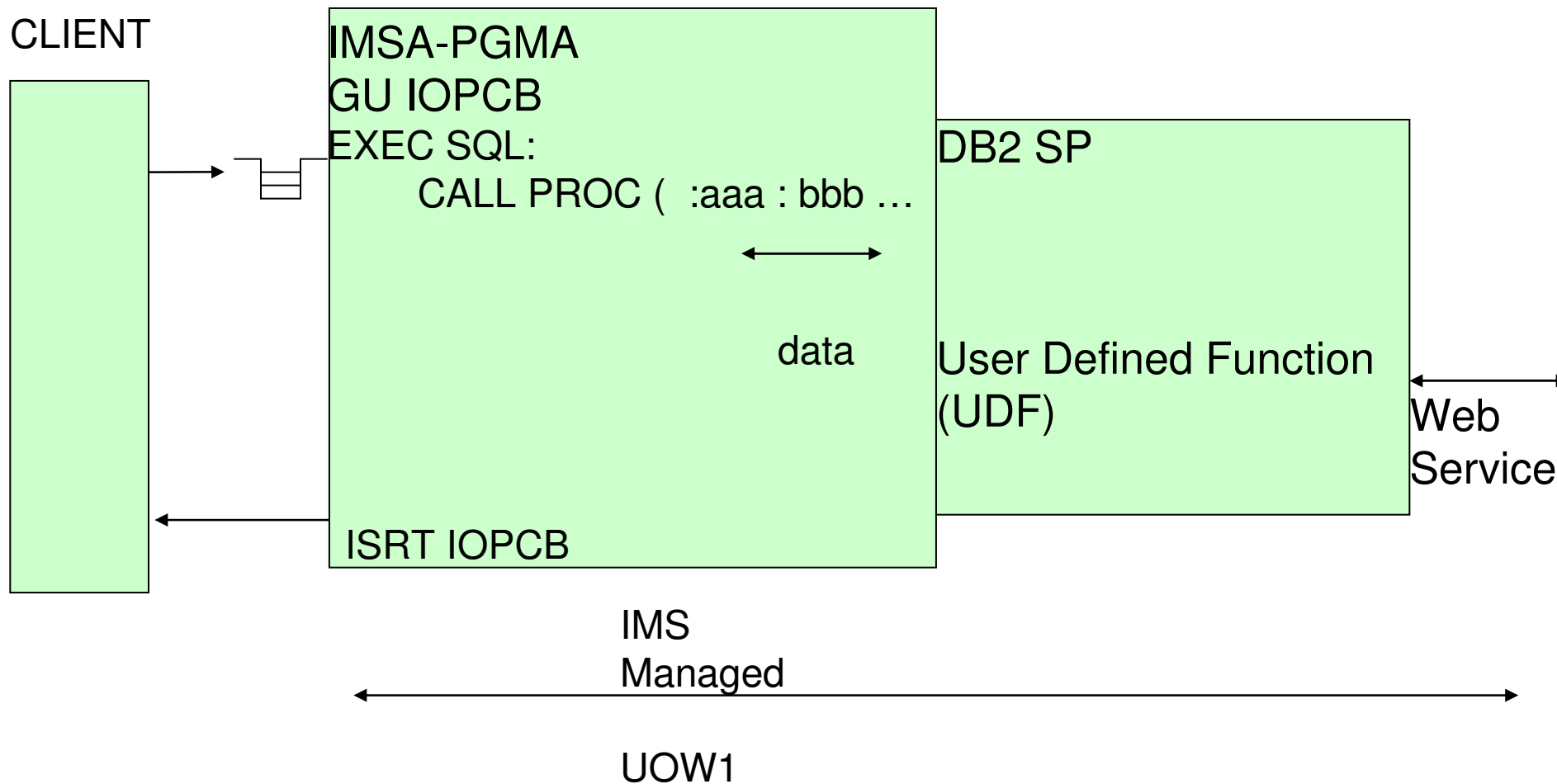


# WebSphere MQ considerations

- Open Standards API calls
- Provides for program-to-program communication
- Asynchronous and synchronous communication
  - IMS Asynchronous
    - ALTPCB
    - Response requires application correlation
  - Synchronous
    - MQ\_NO\_SYNCPOINT
- No distributed coordinated commit
  - IMS is the coordinator via ESAF
- Connection handle is closed
- Requires Queue partner



# DB2 Stored Procedure Synchronous callout via ESAF



## DB2 Stored Procedure considerations

- Open Standards API calls
- Provides for program-to-program communication
- Applications need to know each other
- IMS only supports synchronous communication
- Provides distributed coordinated commit
  - IMS is the coordinator via ESAF
- Requires DB2

# IMS Callout techniques

- Summary
  - DL/I ISRT ALTPCB – for asynchronous
  - DL/I ICAL – for synchronous
  - CPI-C/APPC calls – for asynchronous and synchronous
  - TCP/IP sockets calls – for synchronous
  - WebSphere MQ calls – for asynchronous and synchronous
  - SQL calls to DB2 stored procedures – for synchronous

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