



IBM IMS

IMS Callout Techniques

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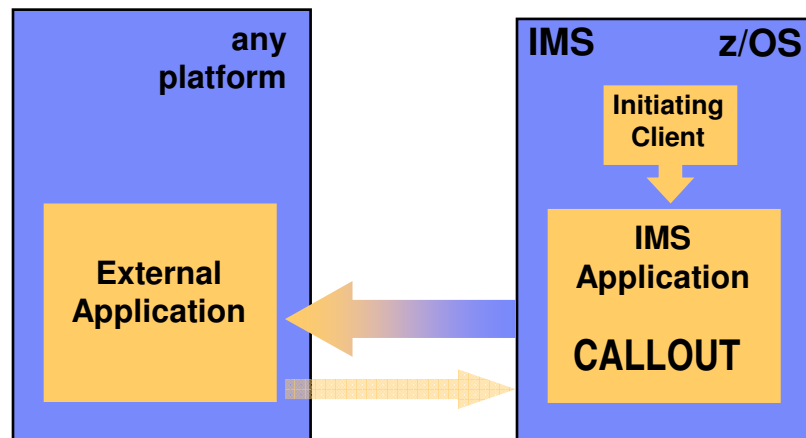
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Agenda

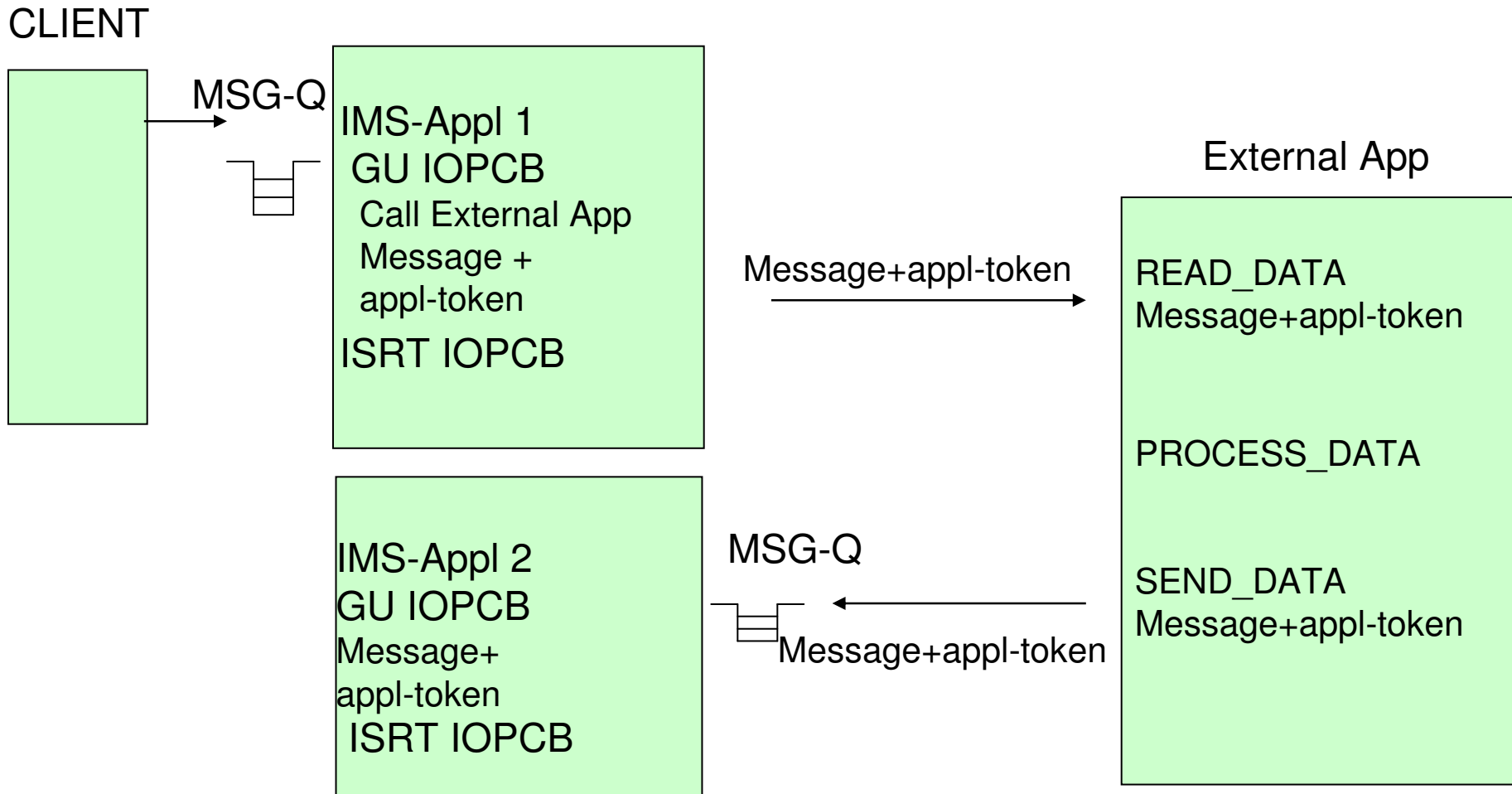
- IMS Callout techniques
 - DL/I ISRT ALTPCB
 - DL/I ICAL
 - CPI-C/APPC calls
 - TCP/IP sockets calls
 - WebSphere MQ calls
 - SQL calls to DB2 stored procedures

IMS as Integration Focal Point

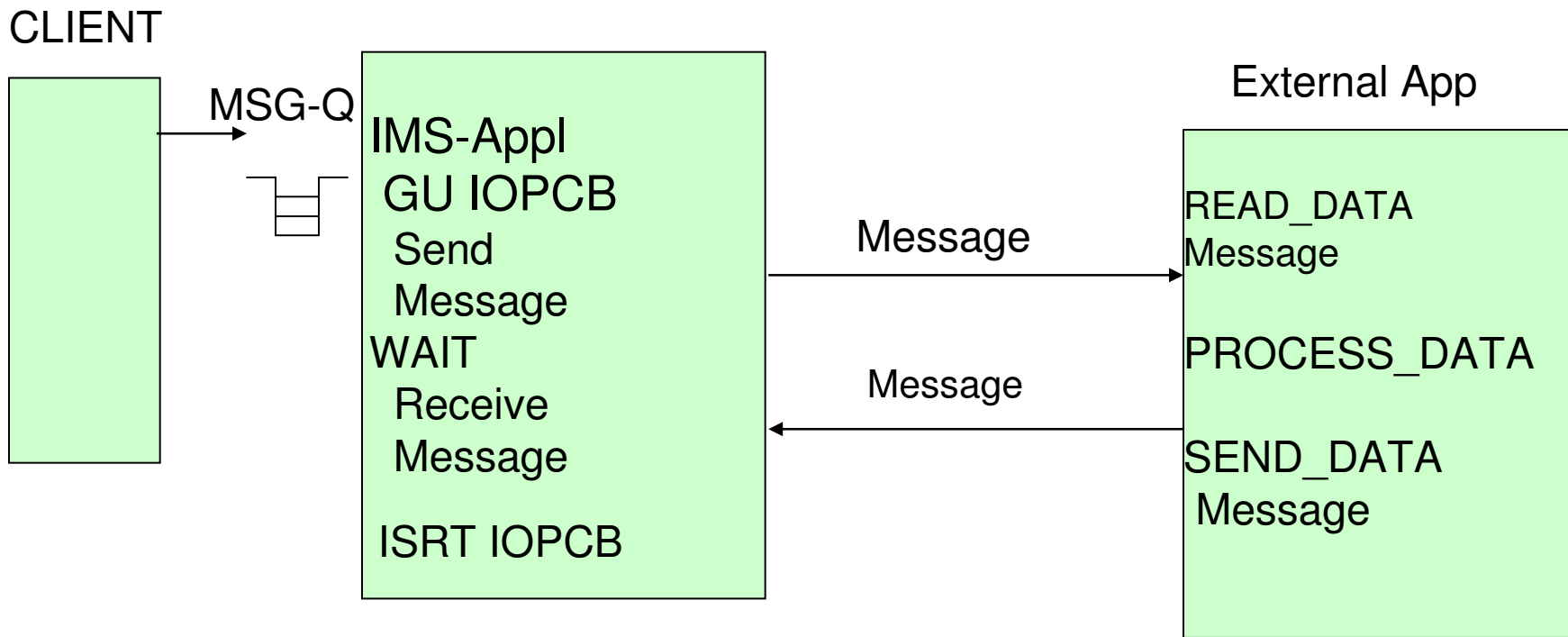


- IMS applications can access other environments and data
- Enables IMS applications as clients to interoperate with applications and servers
 - Better integration of IMS applications for SOA and Web Services
- Maximizes re-use of IMS applications for rapid business innovation and reduced costs

Review - Asynchronous Model



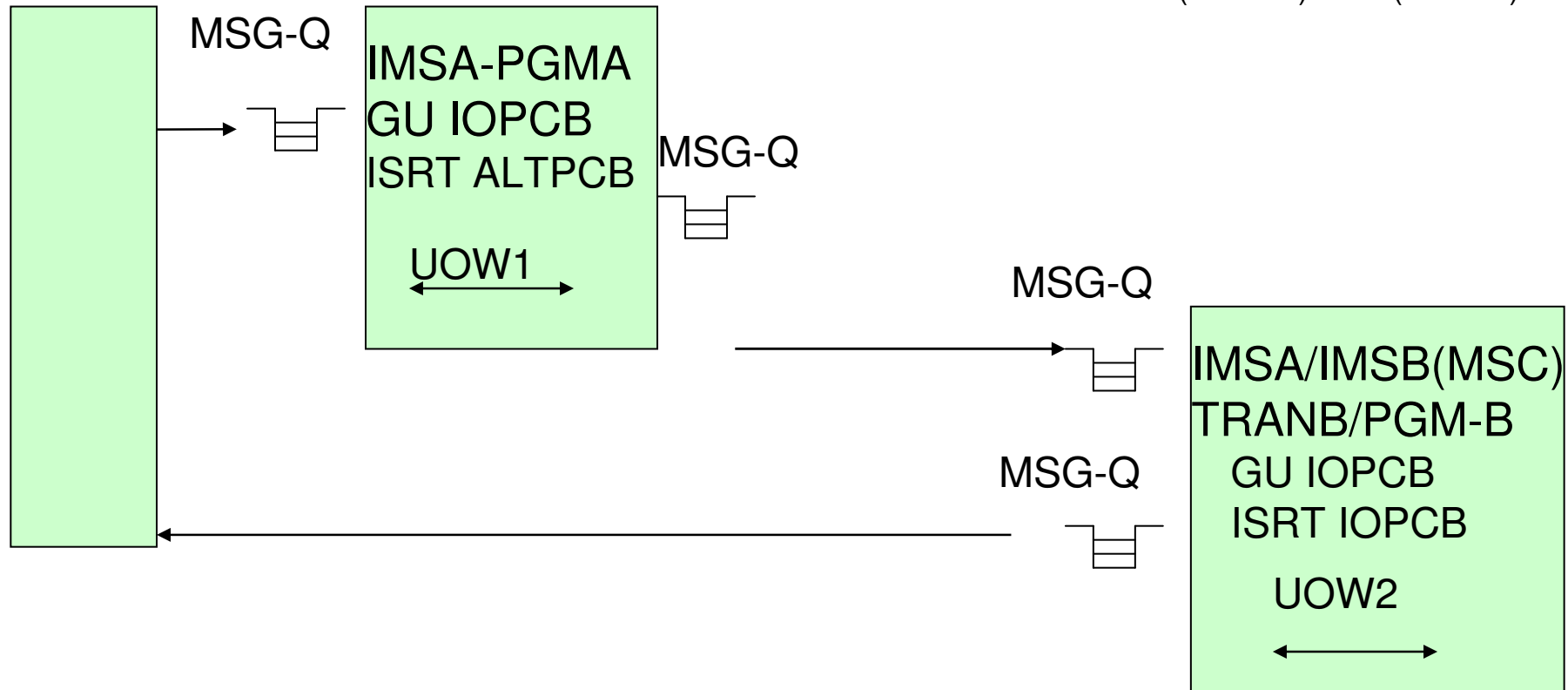
Review - Synchronous Model



IMS DL/I ISRT ALTPCB Asynchronous Callout

CLIENT

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

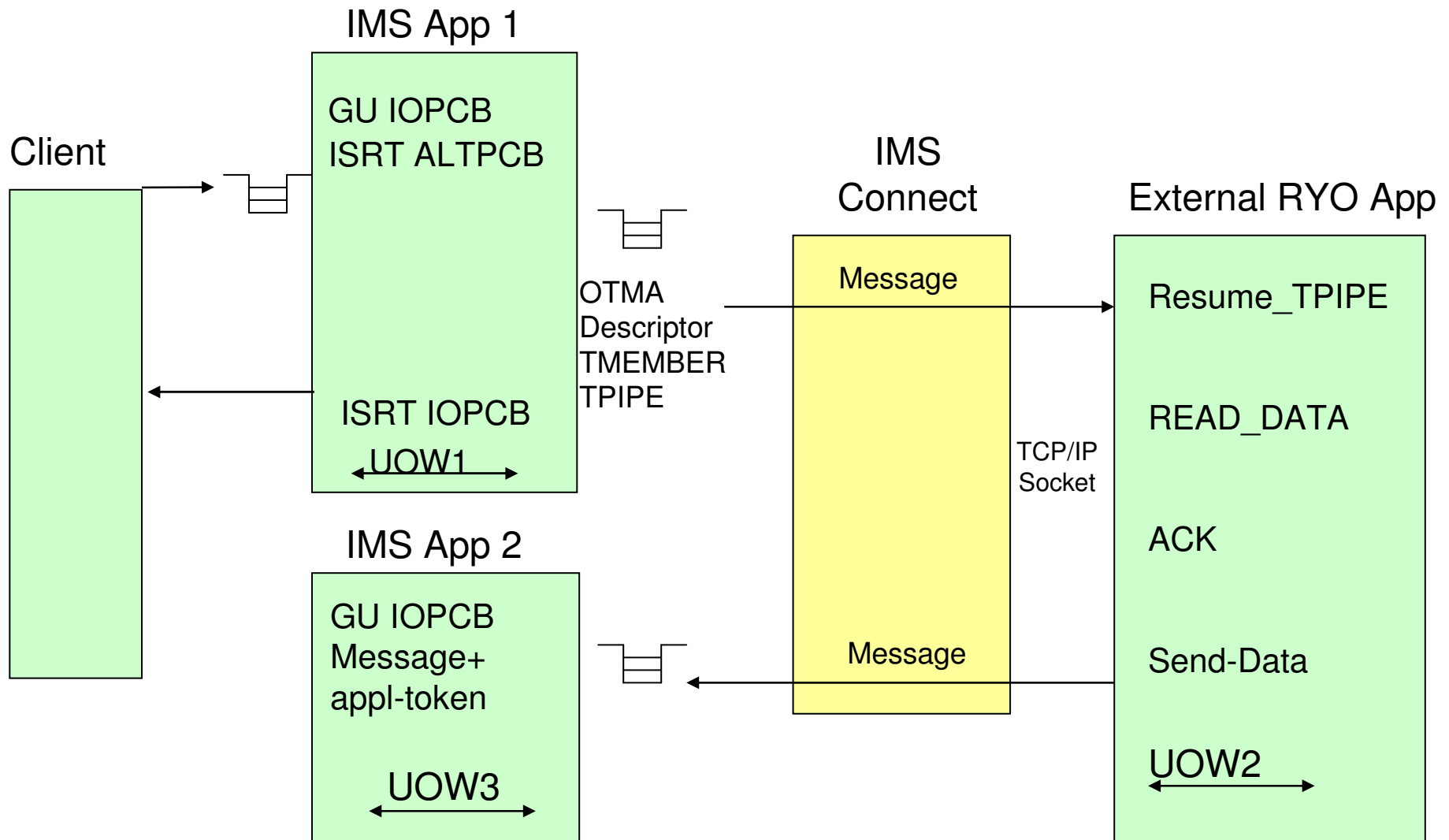
IMS 10 Asynchronous Callout

- 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

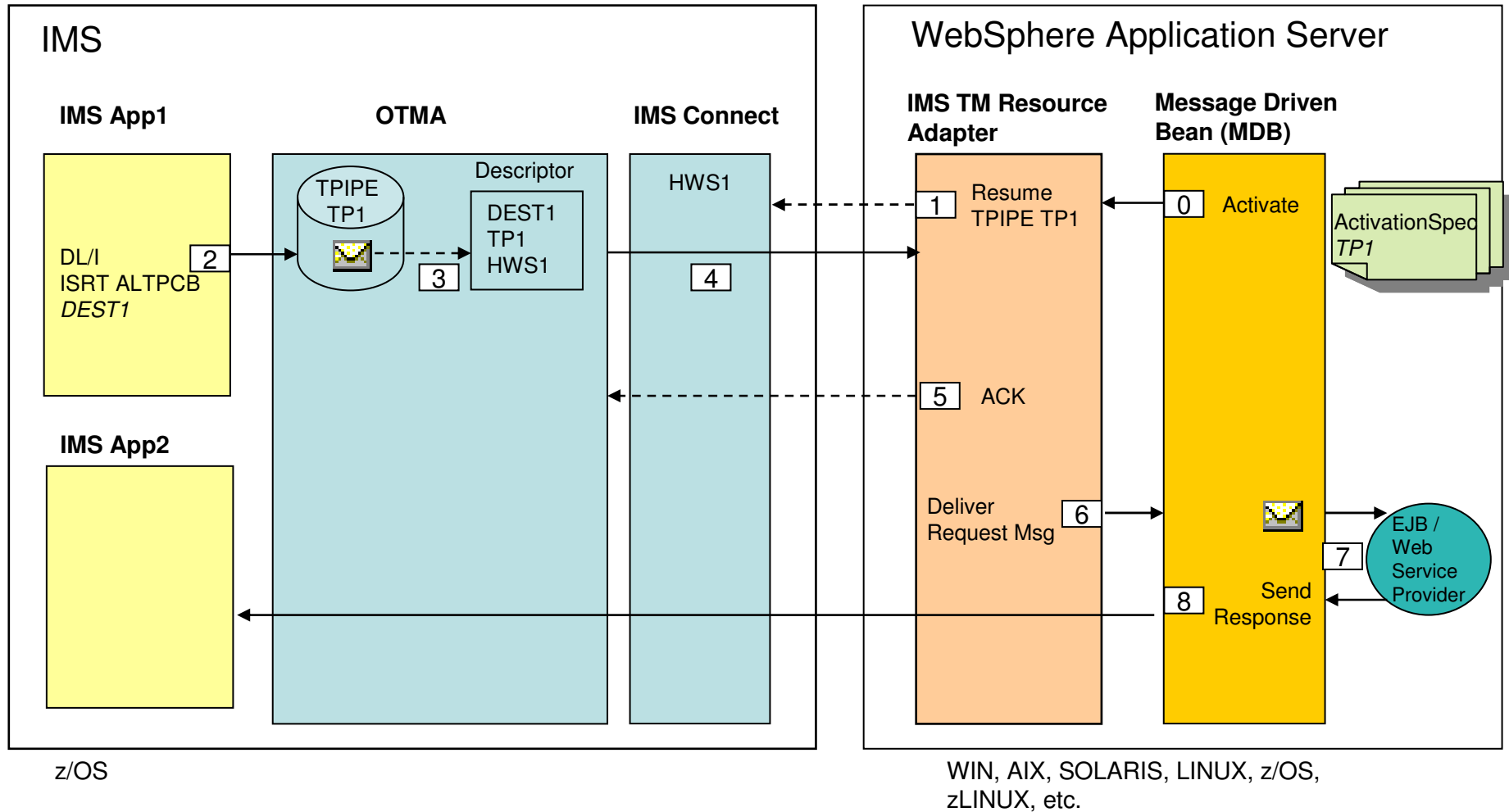
IMS 10 OTMA Descriptors

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

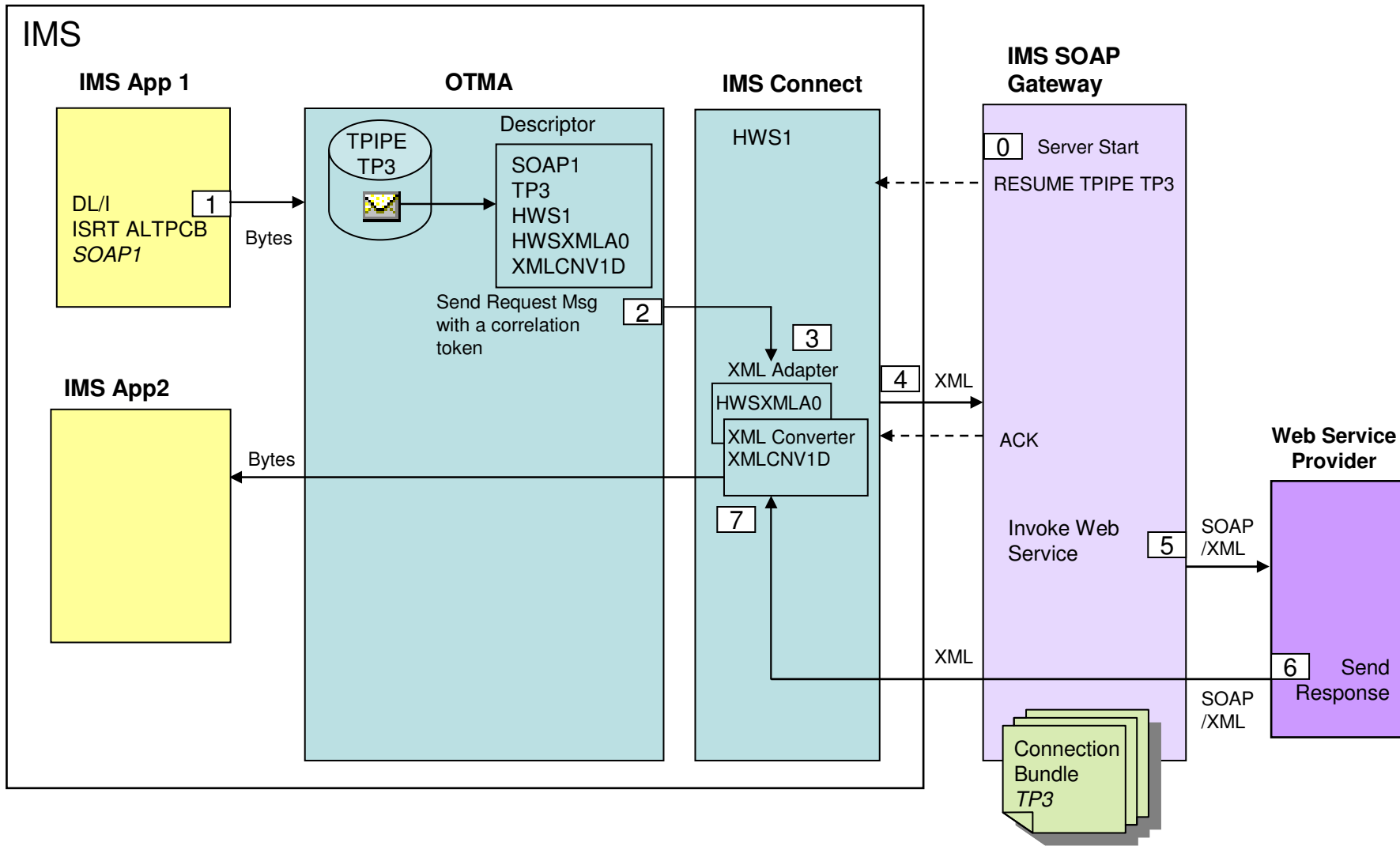
IMS Asynchronous Callout via OTMA IMS Connect



IMS 10 Asynchronous Callout via IMS TM Resource Adapter



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

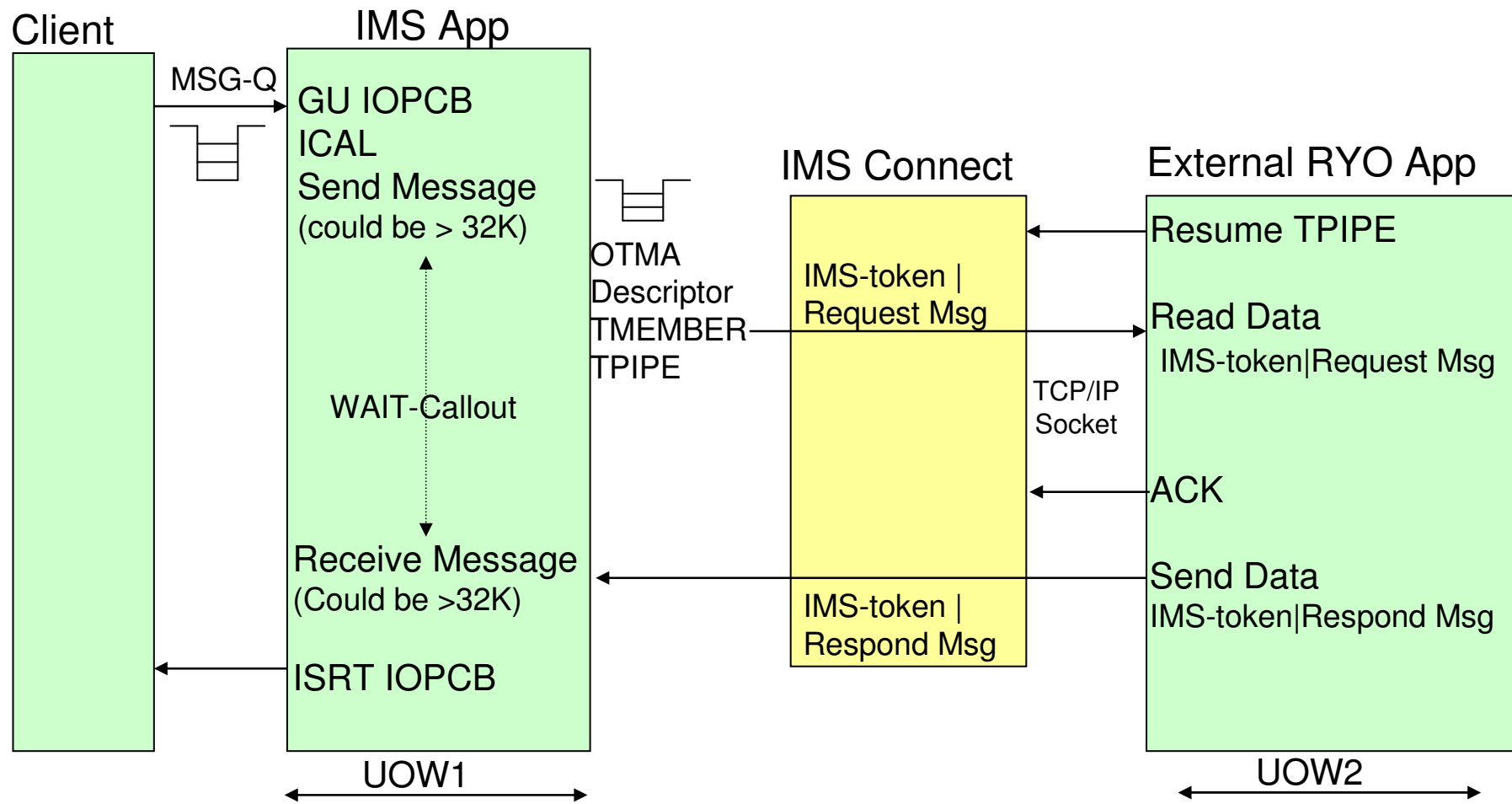
IMS 10 SPE – DL/I ICAL Synchronous Callout

- Enables IMS application to act as a client to asynchronously invoke Java applications and Web Services
 - Callout to Java EE apps (e.g. MDB/EJB) and Web Services using WebSphere Application Server and IMS TM resource adapter
 - Callout to Web services provider using IMS SOAP Gateway
 - Callout to RYO applications (e.g. SAP)
- 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 (IMS correlation token)
 - correlate response message to callout request message

DL/I ICAL

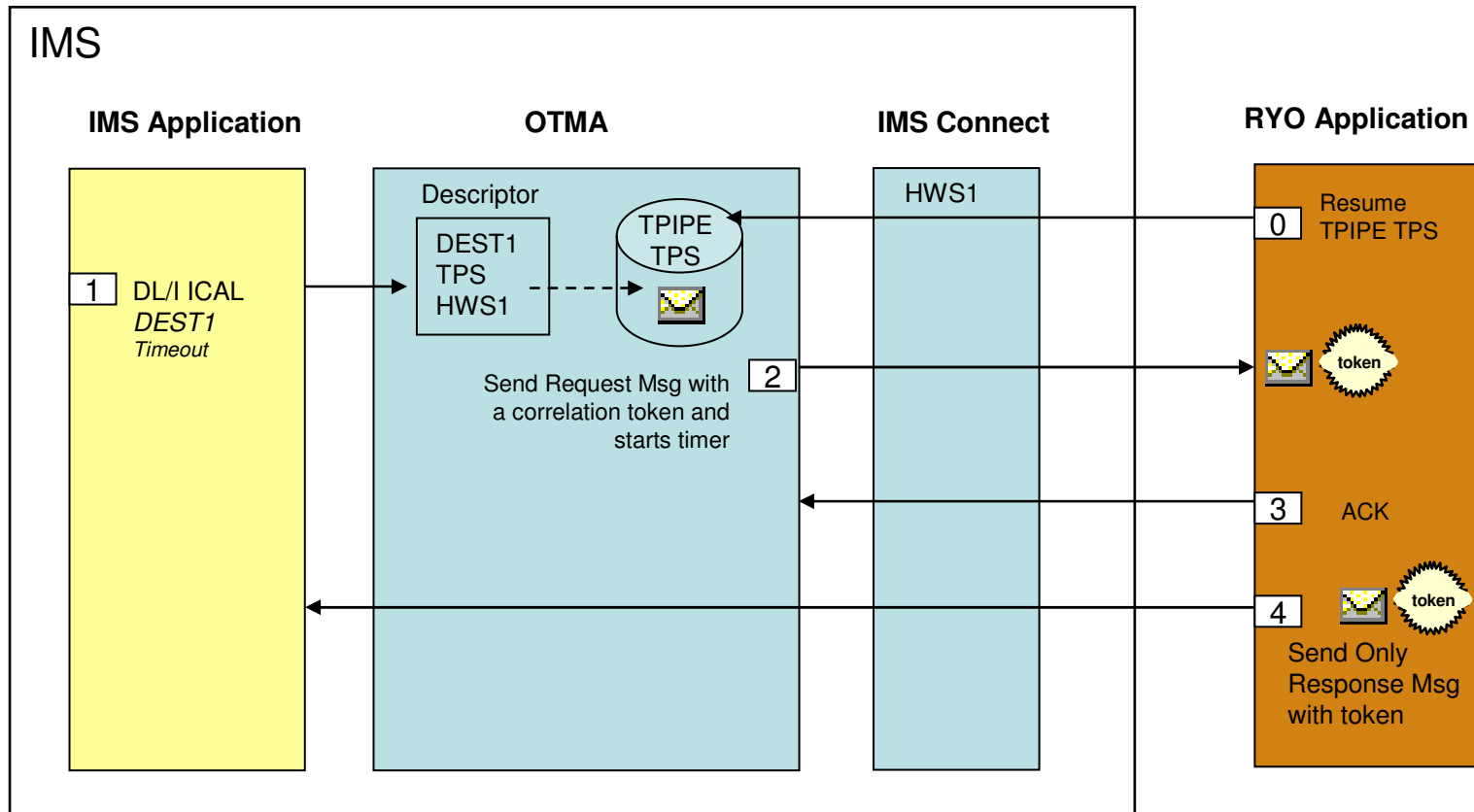
CALL 'AIBTDLI' USING ICAL, AIB, REQ-AREA, RESP-AREA.

- 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.

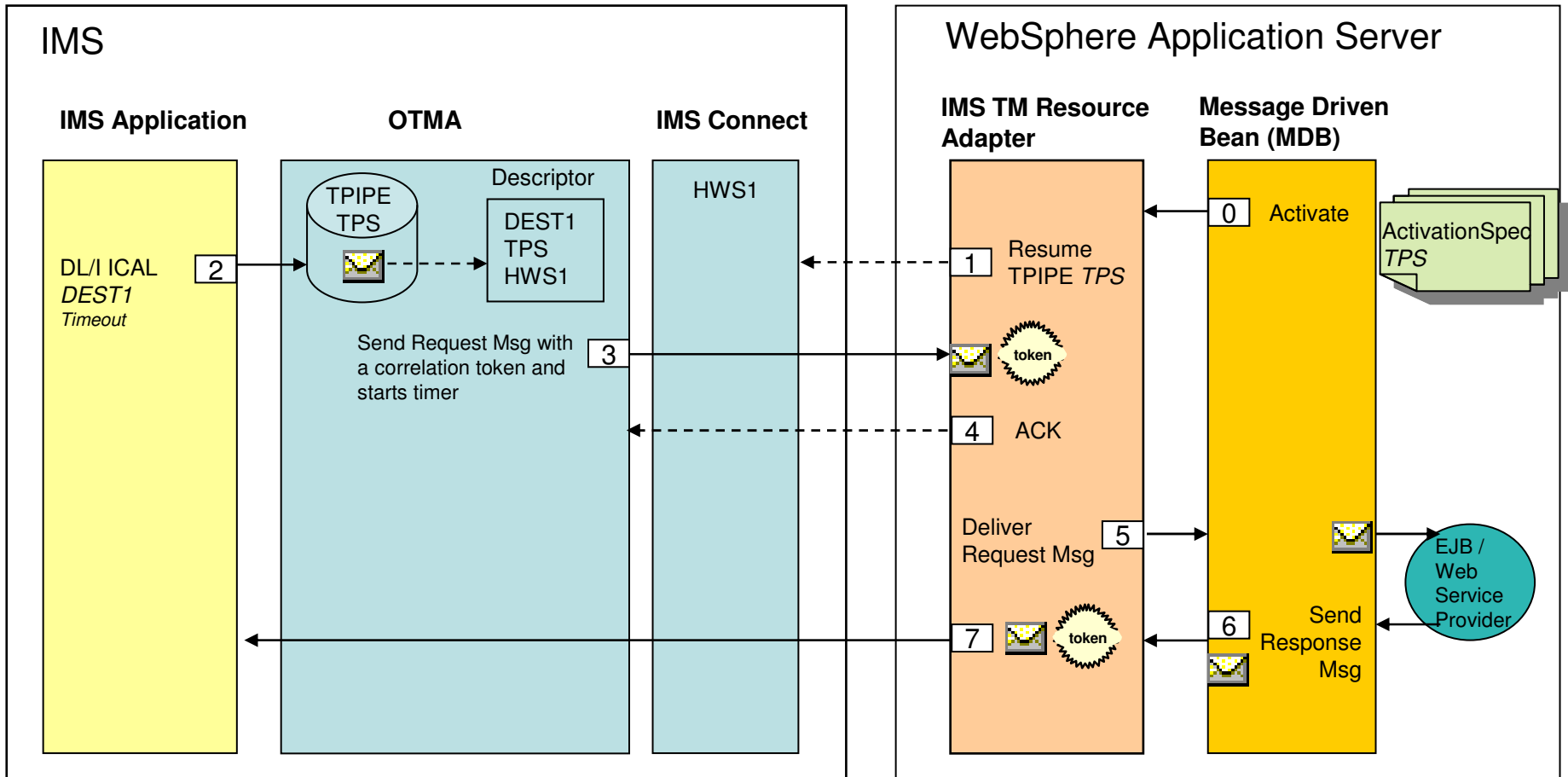
Enhanced OTMA Descriptors for Sync Callout

- DFSYDTx member of IMS.PROCLIB
 - TYPE: Destination type
 - TMEMBER: OTMA Target Client
 - TPIPE: Destination Name
 - SMEM: Super member
 - ADAPTER: Type of IMS Connect Adapter
 - CONVERTR: Converter name called by Adapter
 - **SYNTIMER=timeout**
 - **Note ICAL overrides this value**

IMS Synchronous Callout - RYO



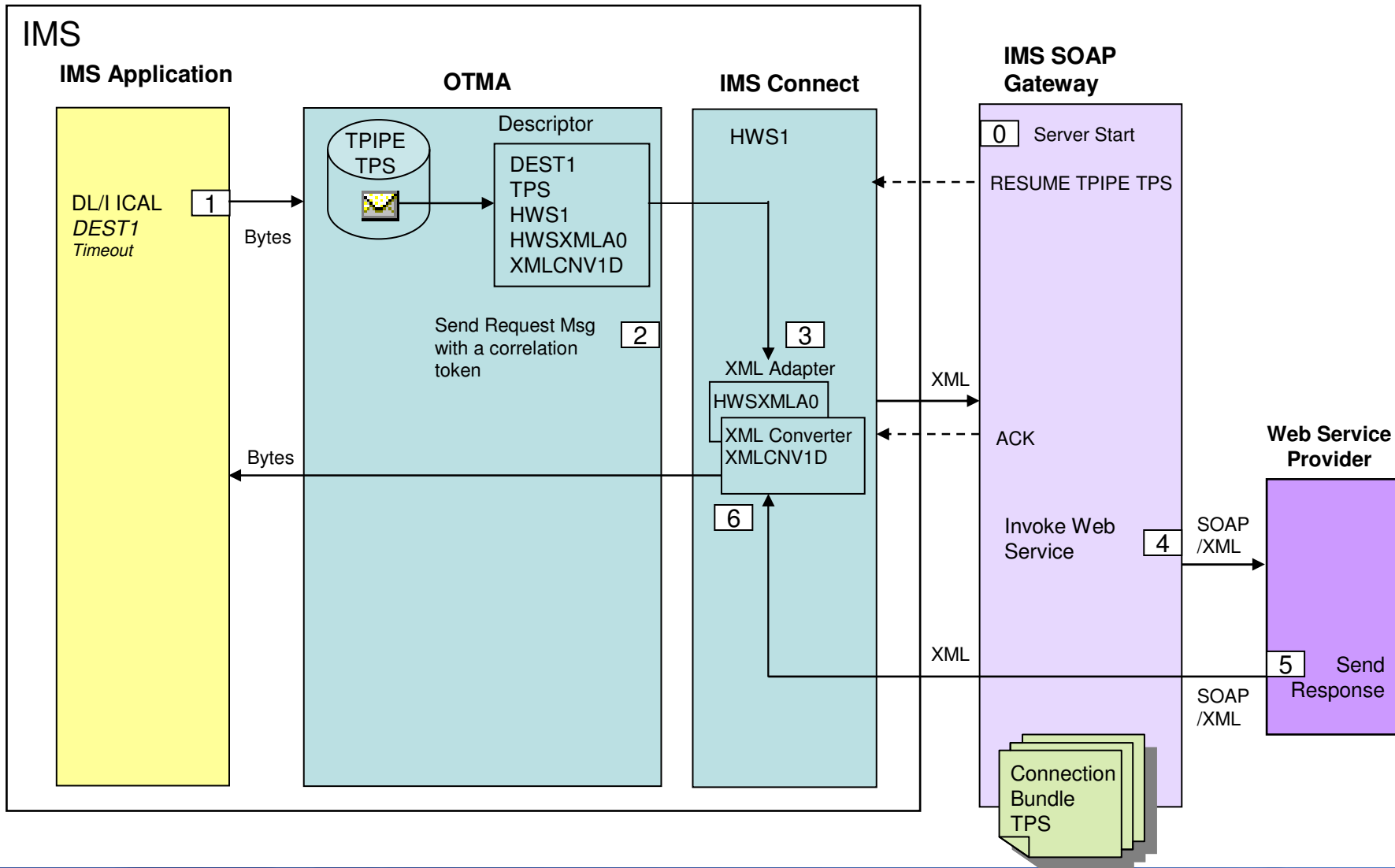
IMS 10 Synchronous Callout via IMS TM Resource Adapter



z/OS

WIN, AIX, SOLARIS, LINUX, z/OS, zLINUX, etc.

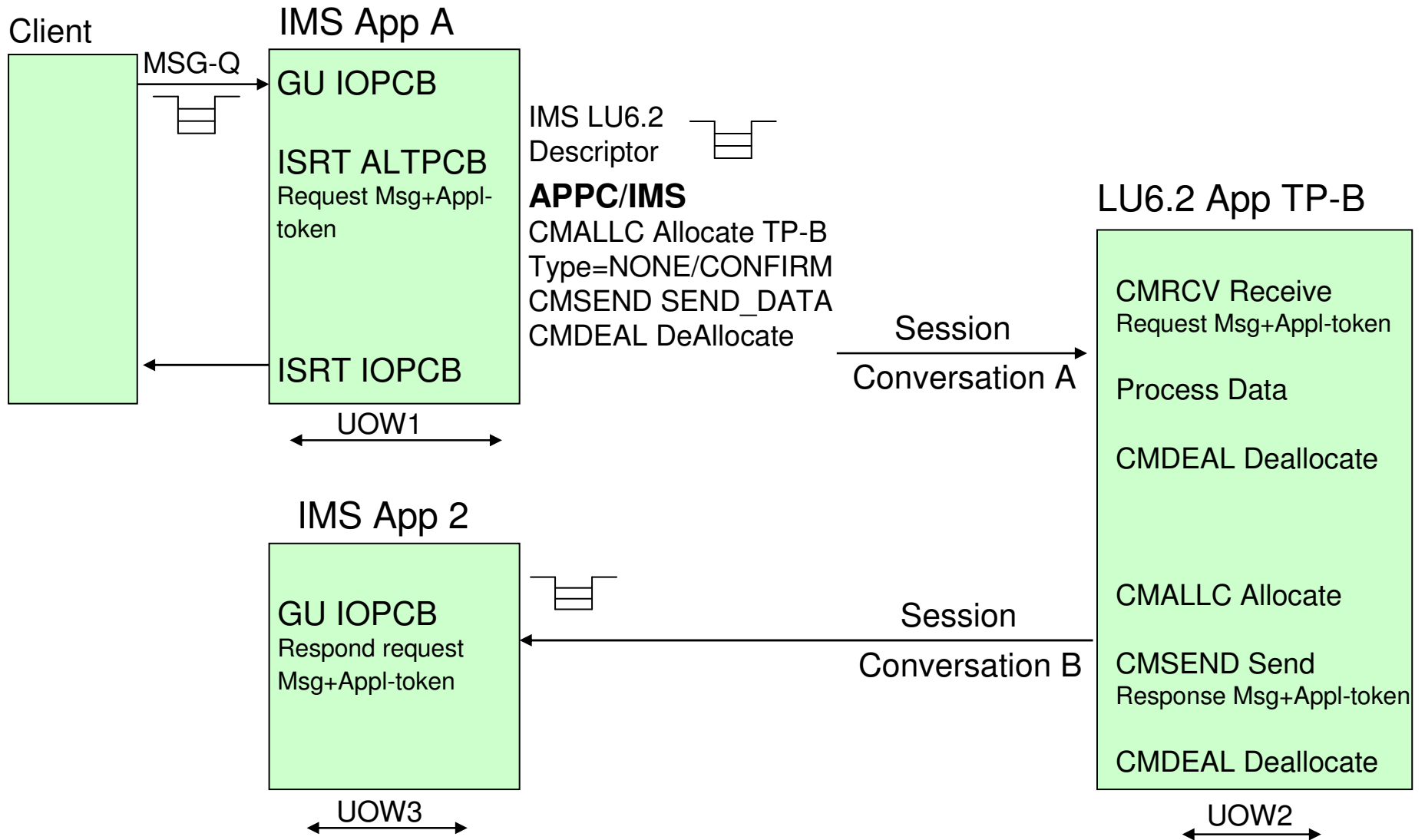
IMS 10 Synchronous Callout via IMS SOAP Gateway



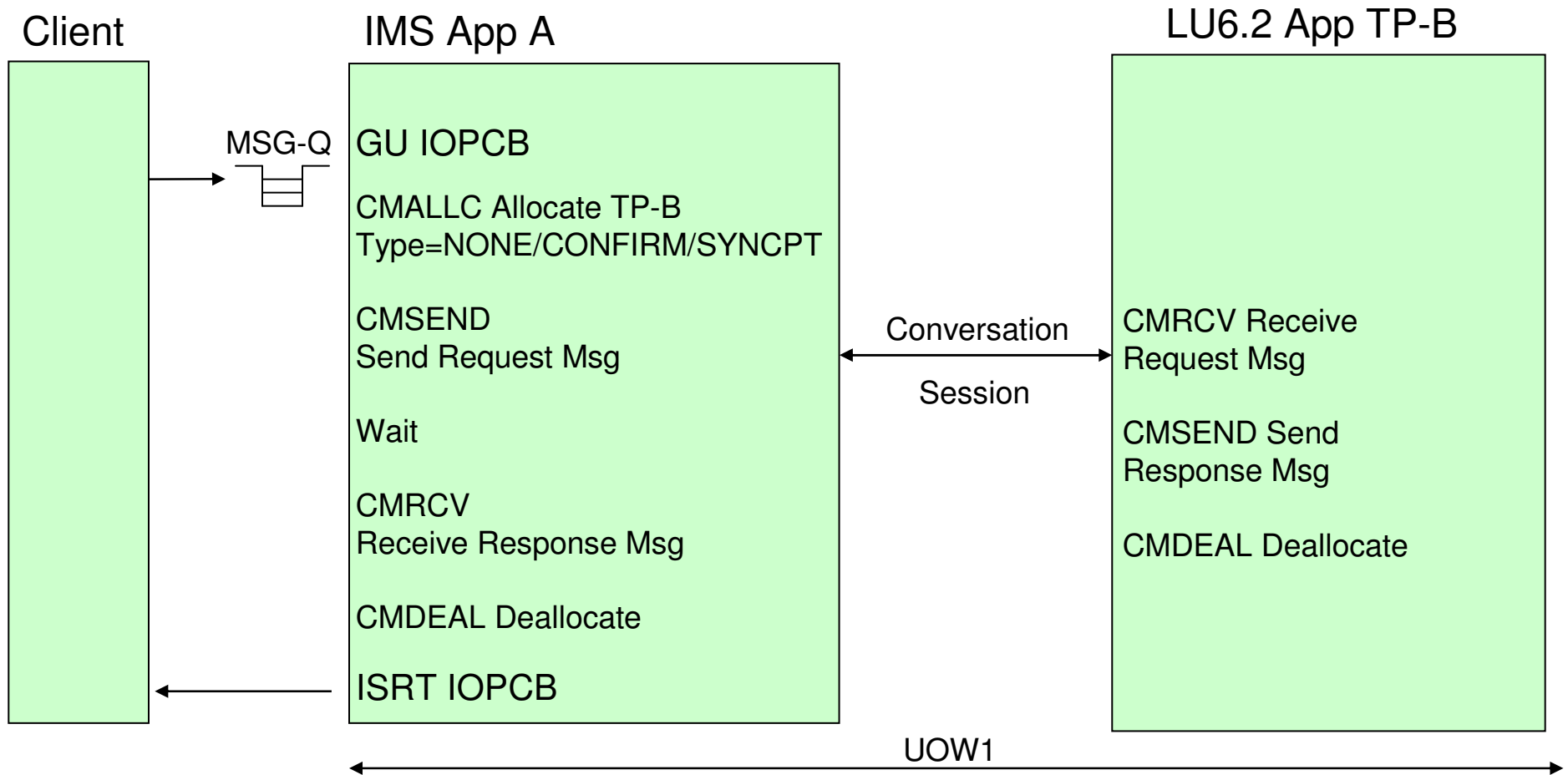
IMS 10 SPE – DL/I ICAL Synchronous Callout

- 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



CPI-C/APPC considerations

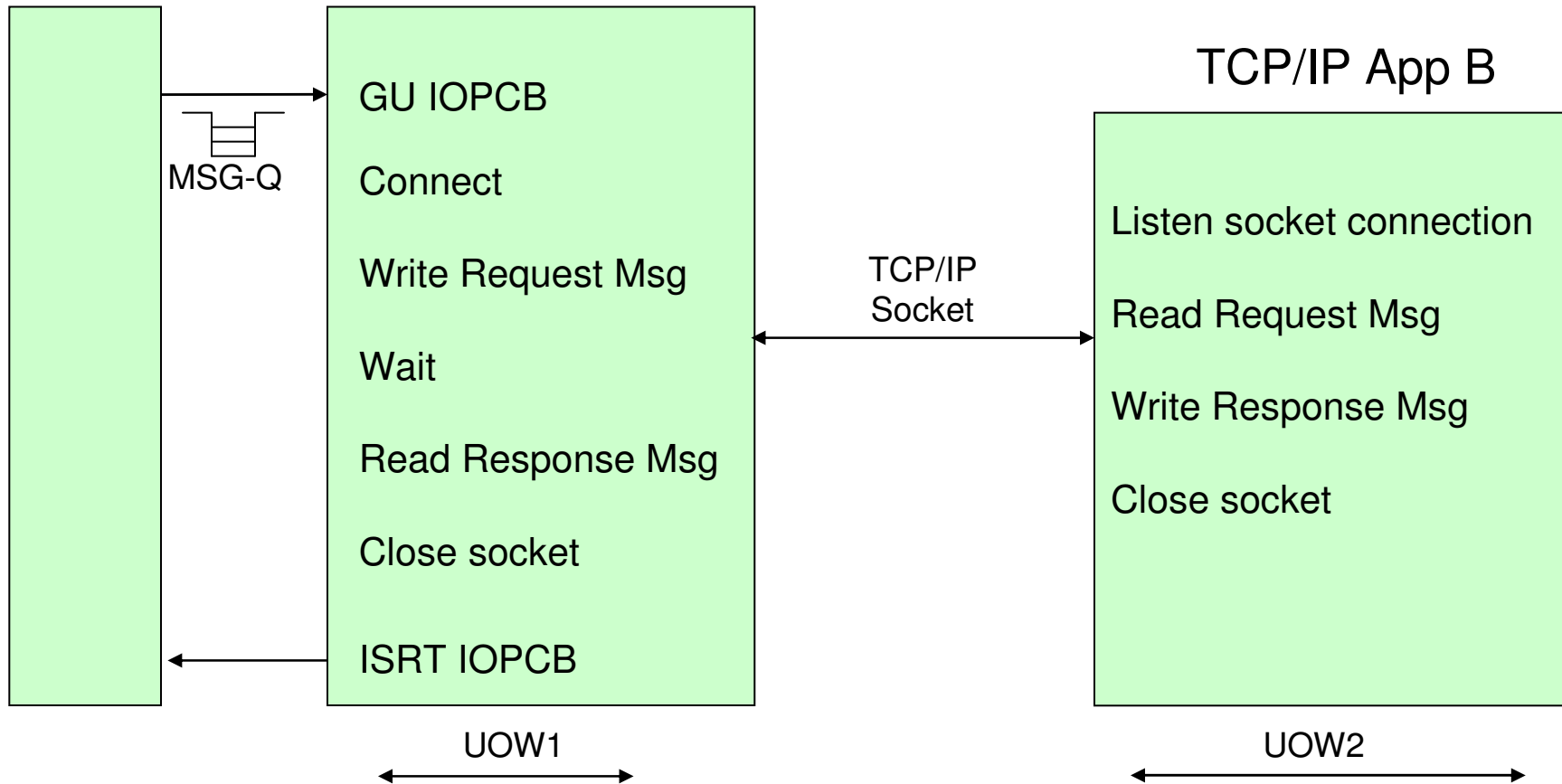
- Open Standards API calls
- Protocol for program-to-program communication
- IMS supports asynchronous and synchronous communication
 - Asynchronous
 - ALTPCB – IMS Allocates LU 6.2 conversation
 - Response requires application correlation
 - Synchronous
 - Can be single UOW or multiple UOWs
- Protocol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

TCP/IP Synchronous callout

CLIENT

IMS App A

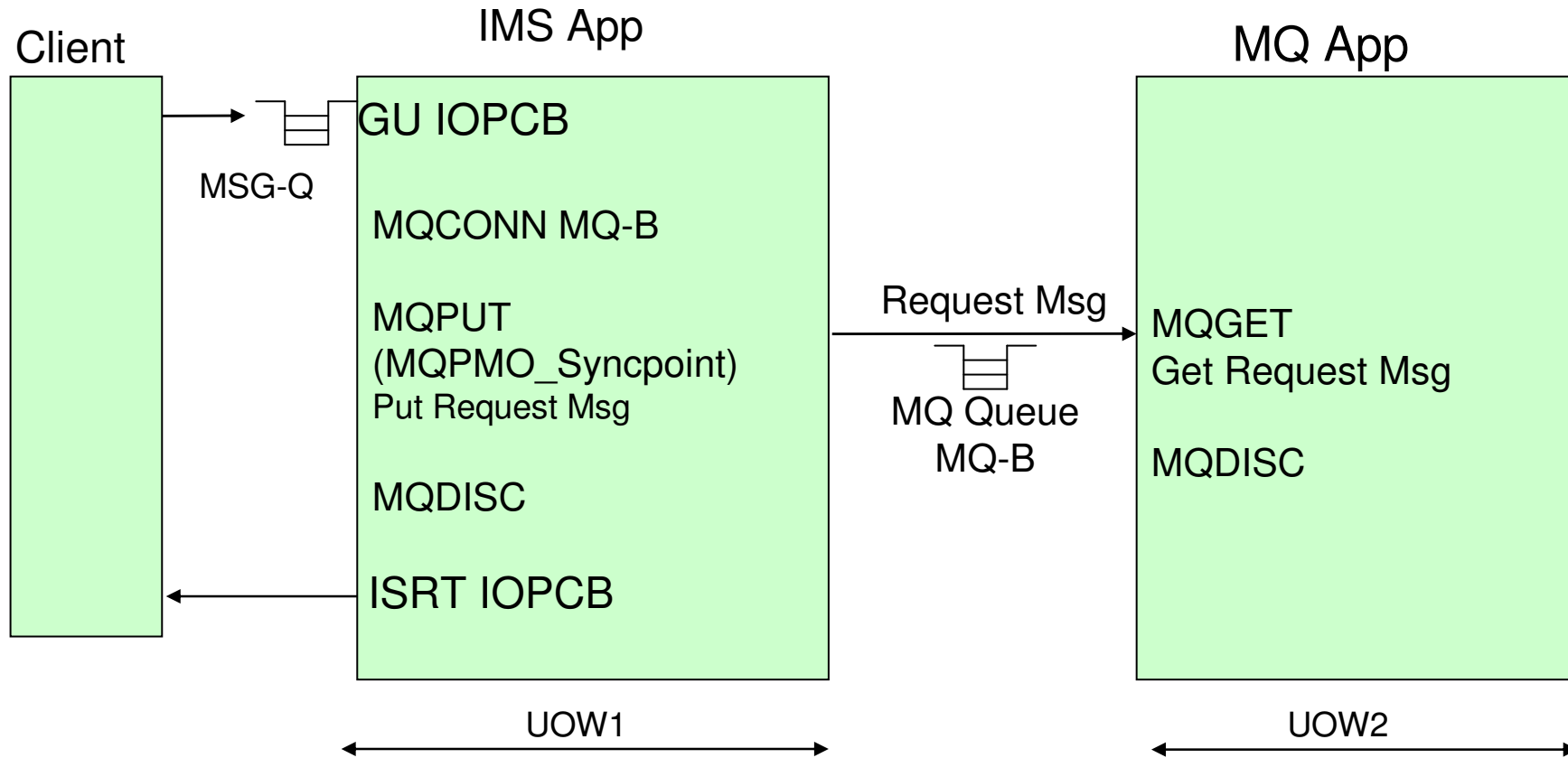
TCP/IP App B



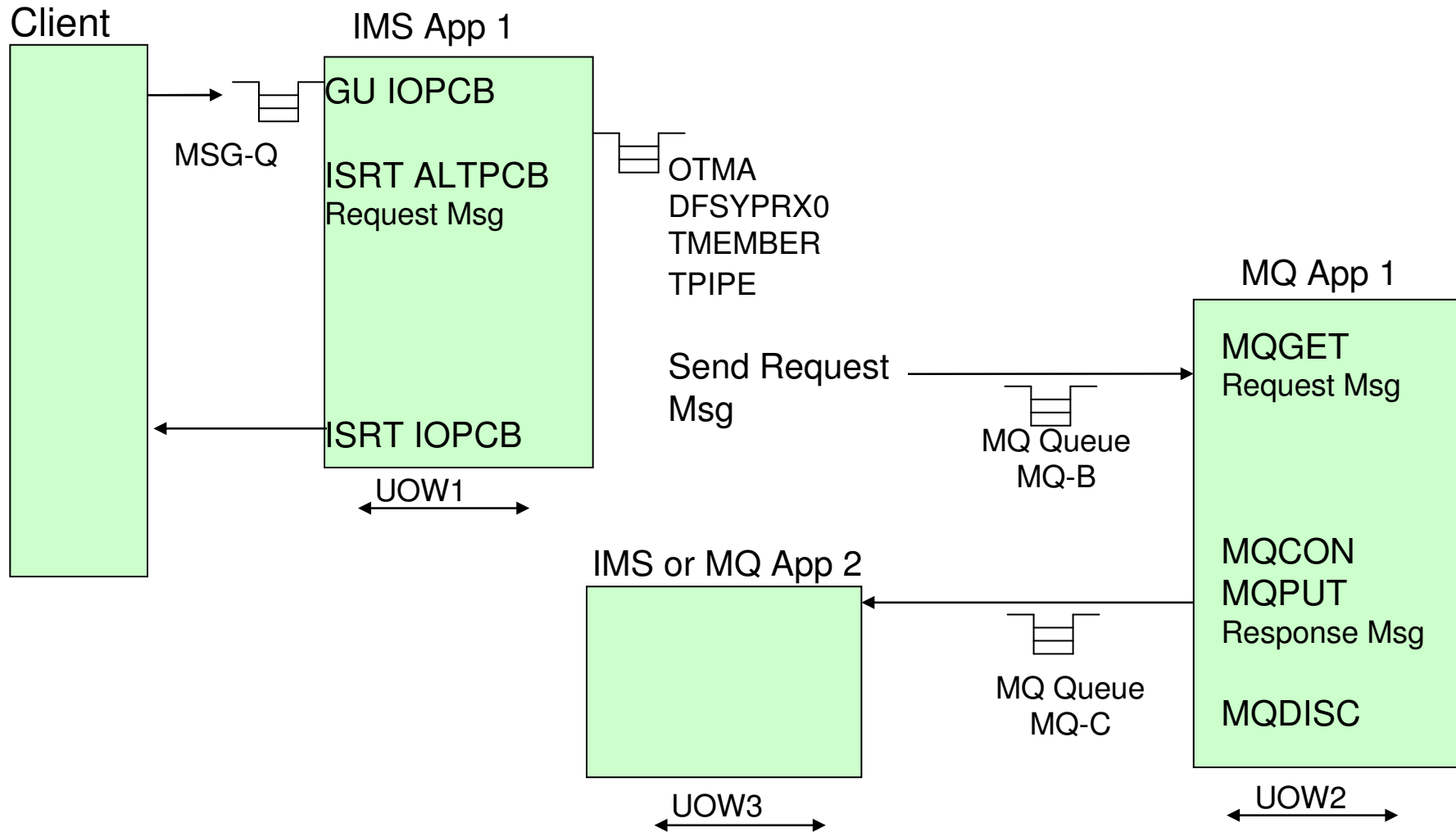
TCP/IP Synchronous callout considerations

- 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

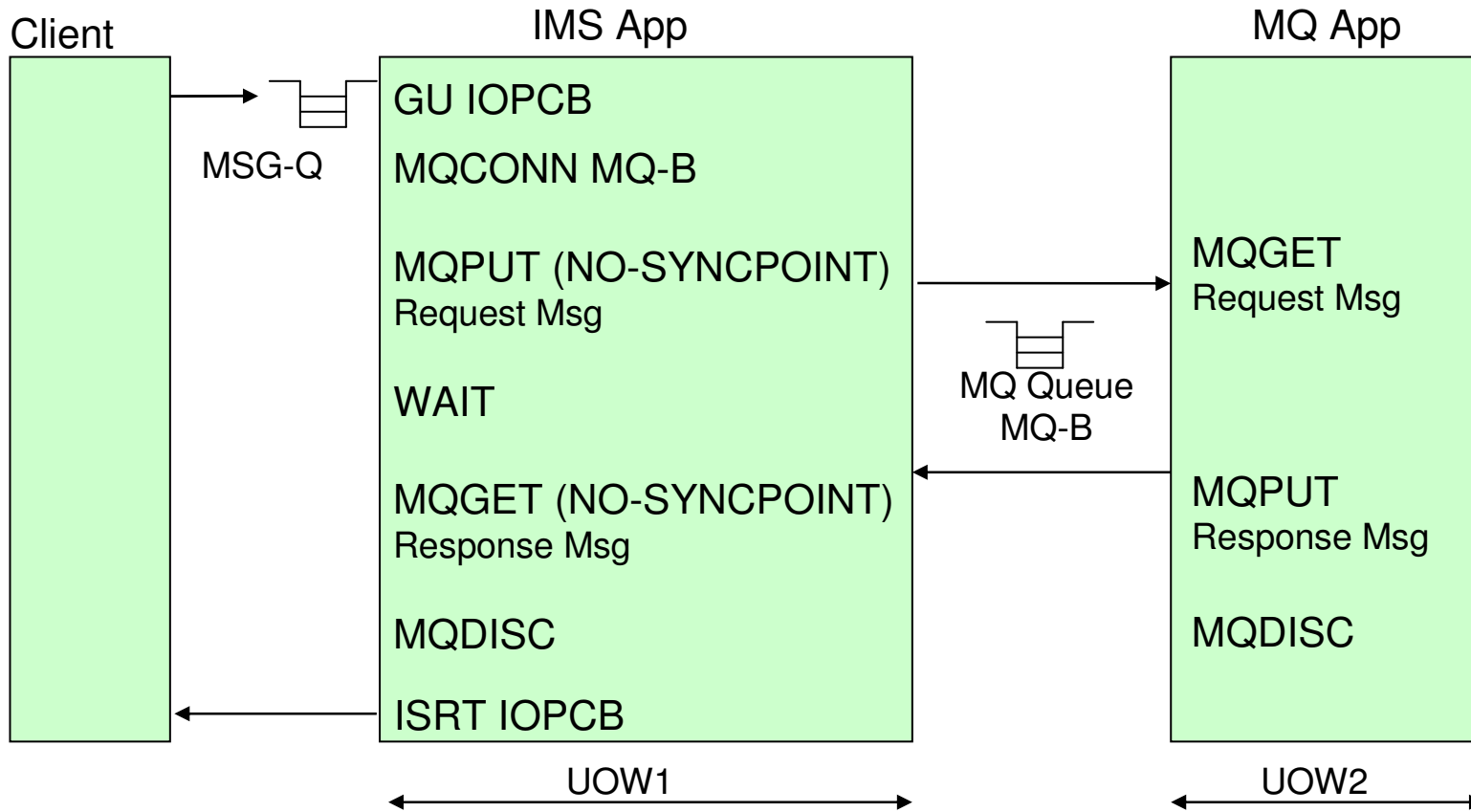
WebSphere MQ Asynchronous Callout via ESAF



WebSphere MQ Asynchronous callout via OTMA IMS Bridge



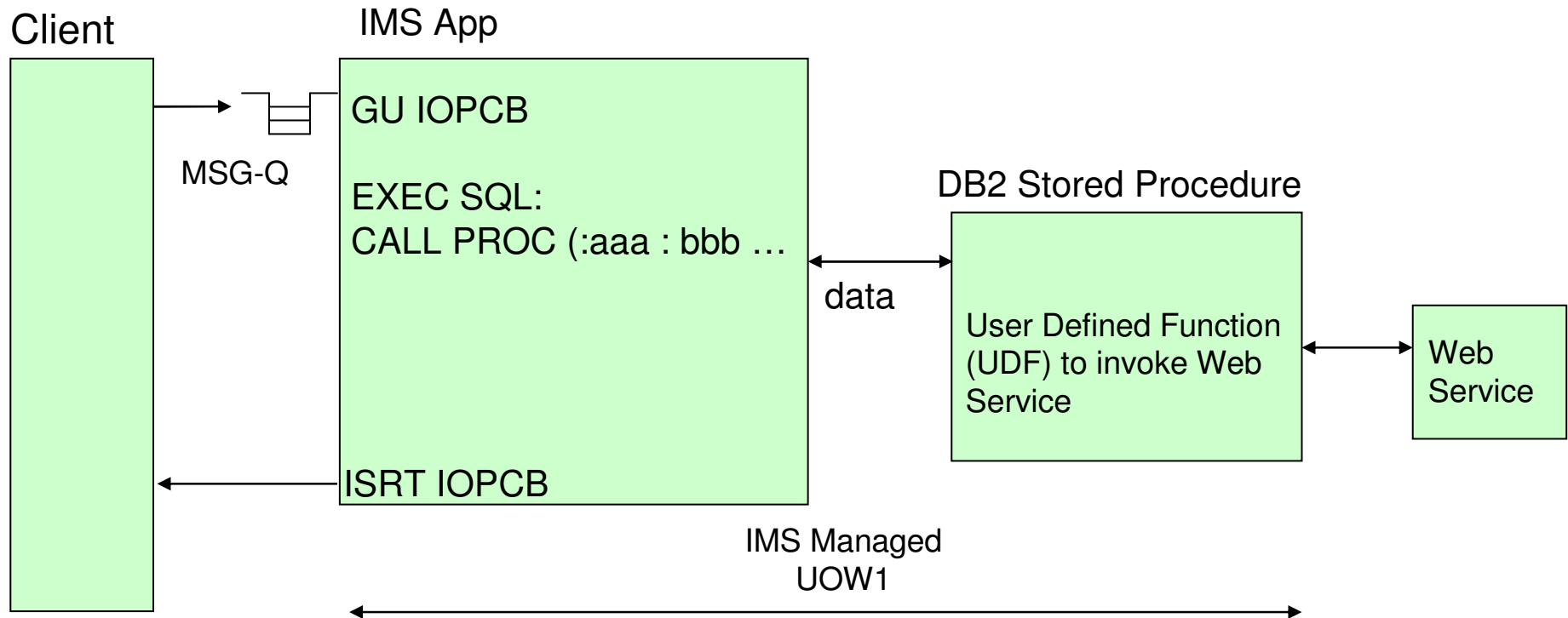
WebSphere MQ Synchronous callout via ESAF



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 MQ 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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