IMS and Integration Security

Share Session 16100

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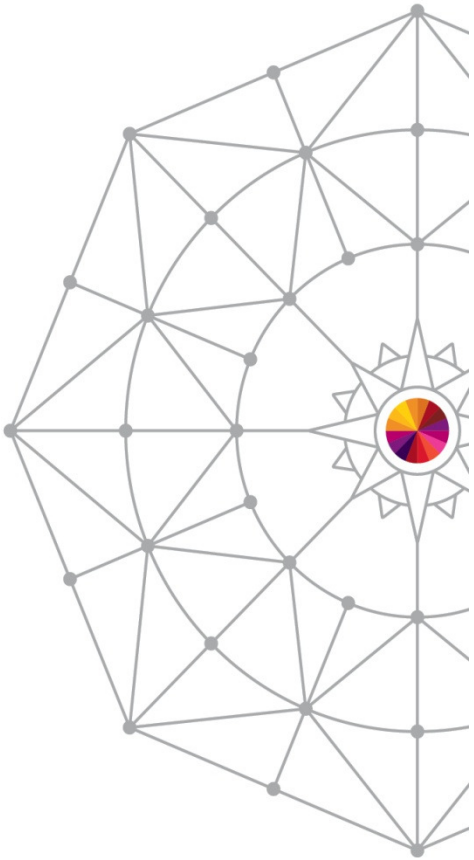

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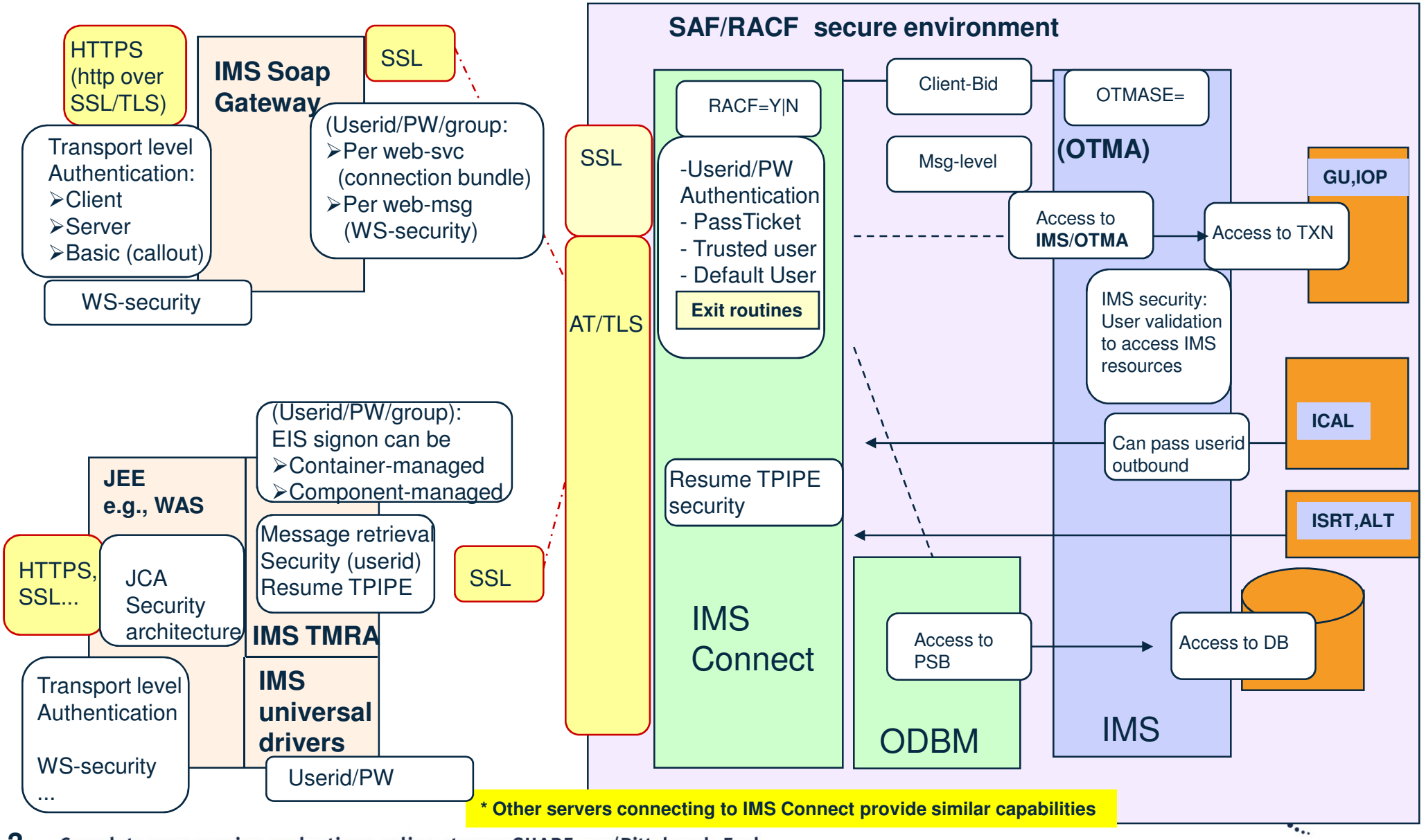
Note

As IMS expands its strategic role in the world of web services, enterprise mobility, and the cloud, a greater focus has been placed on ensuring reliability and security. This presentation discusses how IMS functionality continues to be enhanced to ensure protection of its resources. This includes an overview of how security is handled within the context of evolving technologies.

Security Points in an Integrated World

- Note: this presentation address connectivity options with IMS Connect



Security scenarios

- **IMS as a provider**
  - Transactions
    - Synchronous and asynchronous
  - Commands
  - Database
    - Open DB support and the universal drivers
- **IMS as a consumer**
  - Synchronous callout
  - Asynchronous callout
    - Including Business Event processing

IMS Security

- Continues to be based on userid access to the IMS resource
  - Transaction, command, PSB, DB, etc..

- OTMA
  - OTMA Client Bid security
    - Determines whether an OTMA client, e.g., IMS Connect, can connect to IMS
  - OTMA Message security
    - OTMA setting to determine the level of checking for each message

- ODBM
  - APSB security and/or IMS RAS (ISIS=) security

Userid

- Control blocks that represent the secured user
  - ACEE – Accessor Environment Element
    - z/OS control block which represents a user's identity
      - *Contains the user ID and other related information used in establishing the identity of the user and the user's credentials*
    - Created by the SAF security manager, e.g., RACF
    - IMS security validation uses ACEEs
  - User Token
    - z/OS control block that can be passed and used by IMS to build an ACEE
      - *an 80-byte value which can be used to represent a user*
        - *Contains a user ID, default group ID, and some credential information*
  - RACO – RACF Environment Object
    - A "flattened" ACEE which can be transported from one address space to another address space and reconstituted into an ACEE
    - Can be used across MVS images

Created by components, e.g., IMS Connect, where authentication takes place

OTMA Security

- Two Types of OTMA security
  - OTMA Client Bid security
    - Determines whether an OTMA client, e.g., IMS Connect, MQ, etc., can connect to OTMA
      - *When IMS Connect initializes*
        - *A "Client-bid" message is sent to IMS*
        - *Uses userid associated with IMS Connect*
      - *If OTMA security is enabled (something other than NONE)*
        - *IMS Connect userid must have READ access to the RACF facility classes:*

          IMSXCF.xcfgrp.ims connect-member-name
  - *OTMA Message security*
    - *OTMA setting to determine the level of checking for each message*
- OTMA clients, e.g., IMS Connect, also have their own connection security

OTMA Message Security

- OTMASE = *option (in DFSPBxx member of IMS.PROCLIB)*
  - Where *option* can be set to NONE, CHECK, FULL, or PROFILE determines the level of checking to validate that a userid can access a transaction

    - **NONE** - If OTMA security is set to NONE there is no Message security
      - *No checking of the RACF TIMS Class for user authority to execute tran*
        - *DFSCTRN0 is invoked if it exists and can enforce security*
      - *No checking of the RACF CIMS Class for user authority to issue cmd*
        - *DFSCCMD0 is invoked if it exists and can enforce security*

    - **CHECK, FULL, or PROFILE** - OTMA builds a Userid Hash Table for OTMA Clients (TMEMBERs) and a table to hold RACF ACEEs for verified users
      - *The table is dynamically increased if it fills up*
      - *Userids are checked against the transaction/command resource*
        - *DFSCTRN0 is invoked if it exists and can enforce security*
        - *DFSCCMD0 is invoked if it exists and can enforce security*

OTMA Message Security …

- IMS Security
  - Validates userid access to transaction or command
  - Userid: from message header or RACFID (see IMS Connect security)
  - /SECURE OTMA None | Check | Full | Profile or OTMASE=

- Resume TPIPE Security
  - RIMS SAF/RACF security resource class
    - Security definition association between TPIPE name and Userid/Group that can access the TPIPE
  - OTMA security exit DFSYRTUX
    - Always invoked after the call to SAF/RACF
    - Can override the decision of SAF/RACF
    - Invoked even if new RIMS security resource class is not defined
  - Supports both the asynchronous callout and synchronous (ICAL) callout
  - Authorization is performed by IMS OTMA when the message is retrieved from the hold queue

IMS Connect Security

- Accessing IMS transactions from a remote client
  - Remote TCP/IP Client
    - Provides Userid, Password, Groupid in message header
  - IMS Connect authenticates the userid/password
    - Configuration values for IMS Connect (HWSCFGxx)
      - *RACF = Y | N and RACFID = userid (default)*
      - *Issues RACROUTE calls to authenticate user if RACF=Y*
    - Message exits can also call a user-written routine which are called before any SAF/RACF calls:
      - *IMSLSECX –security exit routine for transactions and commands*
      - *HWSAUTH0 – security exit routine for DB requests*
    - Default RACFID
      - *Useful if the inbound request does not carry a userid value and a value needs to be passed into IMS for authorizing access to resource*
        - *Does not provide an override for requests that carry a blank userid from the IMS TM resource adapter (e.g., WAS environment)*

Securing Access to IMS Connect …

- Accessing IMS transactions from a remote client …
  - Basic security …
    - Considerations
      - *Security requests flow in the clear*
      - *No encryption*
  - Alternatives:
    - IMS Connect Security enhancements
      - *Passtickets*
      - *Trusted User Support*
      - *SSL*
    - AT-TLS

Passticket Support

- Provides an encrypted alternative to sending a password
  - One-time-only password that removes the need to send passwords across the network in clear text
  - Generated/interpreted by an algorithm using:
    - Userid,Application identifier (APPLID), Timestamp, Secured signon key for encryption
- Implementation:
  - The client environment generates the PassTicket
  - IMS Connect calls RACF to interpret/validate the PassTicket
    - Uses APPLID value coded on DATASTORE statement or value passed in the IRM header
  - RACF uses PTKTDATA profile definition
    - Profile name matches APPLID name
    - PassTicket replay protection (default)

Trusted USER Support

- Trusted User Support
  - Bypasses security check for messages from 'trusted' users even with RACF=Y
  - Provided by **HWSSMPL0/HWSSMPL1** user msg exits
    - Sample logic

Look for these lines in HWSSMPL0 and HWSSMPL1

```
************************************************************
**************TRUSTED USER SUPPORT**************
************************************************************
```

- To implement trusted user support
  - Define and provide logic in both:
    - Client code
      - *Indicator in the IRM that the message is from a trusted user*
    - HWSSMPL0/HWSSMPL1 or your own user message exit
      - *Detects the indicator in the IRM and bypasses security check*

Secure Sockets Layer

- SSL - TCP/IP encryption and authentication protocol
  - Secure transfer of sensitive information
    - Provides a private channel between client and server that ensures:
      - *Privacy of data*
      - *Authentication of partners*
      - *Message integrity*
    - SSL Standard
      - Handshake protocol for initial authentication/transfer of encryption keys
        - *Agreement on how to encrypt/decrypt data and the format to transmit the encrypted data*
        - *Authentication of each side using assymetric public/private key mechanism with digital certificates*
      - SSL Record protocol
        - *protocol for transferring data using agreed upon encryption / decryption*
        - *Symmetric key encryption uses the negotiated session keys*

Secure Sockets Layer …

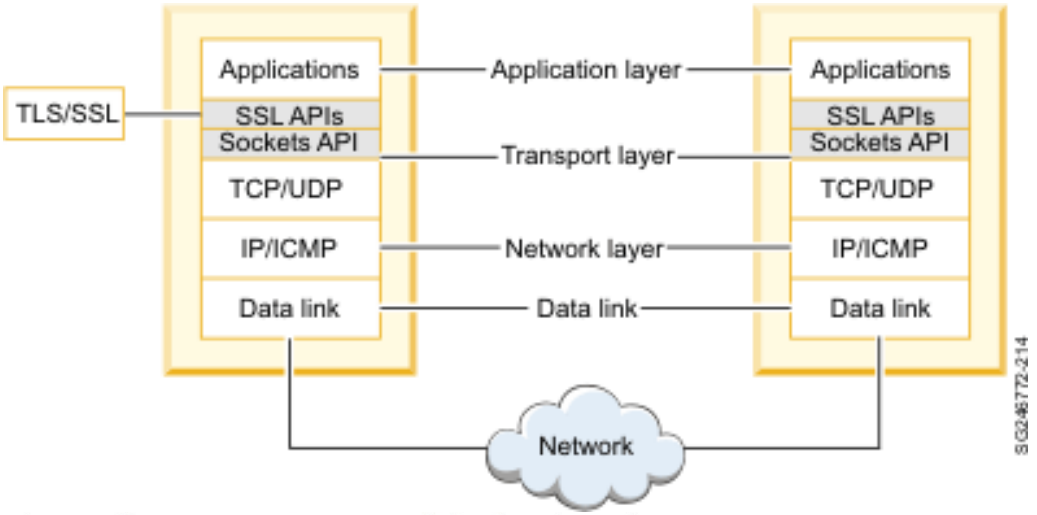
- SSL terminology
  - ***Certificate*** *(digital certificate)*
    - Contains information about owner, e.g., name, company, and public key
    - Signed with a digital signature by a trustworthy Certificate Authority (CA)
  - ***Certificate Authority (CA)***
    - Trusted party that creates and issues digital certificated to users and systems
      - *SAF/RACF can be used as a CA for an enterprise environment*
    - Maps an identity, e.g., host name, to a specific public/private key pair in order to build trust
      - *The CA itself has its own self-signed public/private key pair*
        - *Certificates issued by the CA are signed with the private key of the CA while the authenticity of a certificate can be verified by using the public key of the CA, which is available in the CA's certificate.*
  - ***Keystore***
    - File structure that holds key entries, such as the private key of the user
  - ***Truststore***
    - A keystore that holds only certificates that the user trusts
    - This is optional structure since the certificates can also be kept in the keystore

Secure Sockets Layer …

- SSL for zOS key management
  - Provides callable application services from the sockets api
  - Supports PKI (Public Key Infrastructure) keys and certificates in either:
    - HFS "key database", managed by the Unix shell gskkyman utility
    - ***RACF key rings*** (groups of private keys and certificates) in a RACF database, managed by the RACF command RACDCERT
      - *preferred method*

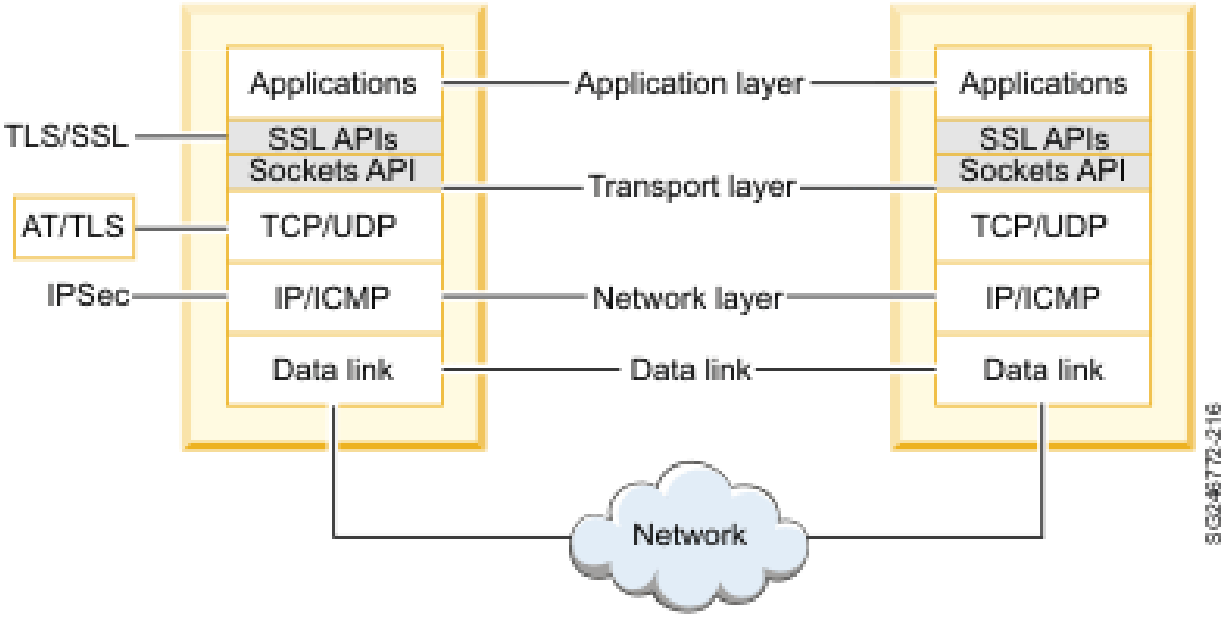
SSL → TLS

- Transport Layer Security – an evolution from SSL
  - SSL is a protocol standard developed by the Netscape Communications Corporation that uses encryption to provide confidentiality and authentication between two TCP/IP applications
  - As SSL gained in popularity, the IETF formally standardized SSL, made a few improvements and changed the name to Transport Layer Security (TLS)
  - TLS is defined in Request for Comments (RFC) 2246
    - Authentication of the server
    - A decision about how the data is to be encrypted
    - Optionally, the authentication of the client



TLS -> Application Transparent TLS (AT-TLS)

- Application Transparent TLS (AT-TLS) is a unique usage of TLS on z/OS
  - Instead of having the application itself (IMS Connect) be aware of TLS
    - Establishing the TLS connection is pushed down the stack into the TCP layer
  - Remote clients cannot distinguish between "normal" TLS (where the z/OS server application does the socket calls necessary for TLS) and AT-TLS (where the TCP layer handles the connection)
    - Application on z/OS can run without even being aware that the underlying connection to the remote client is using TLS

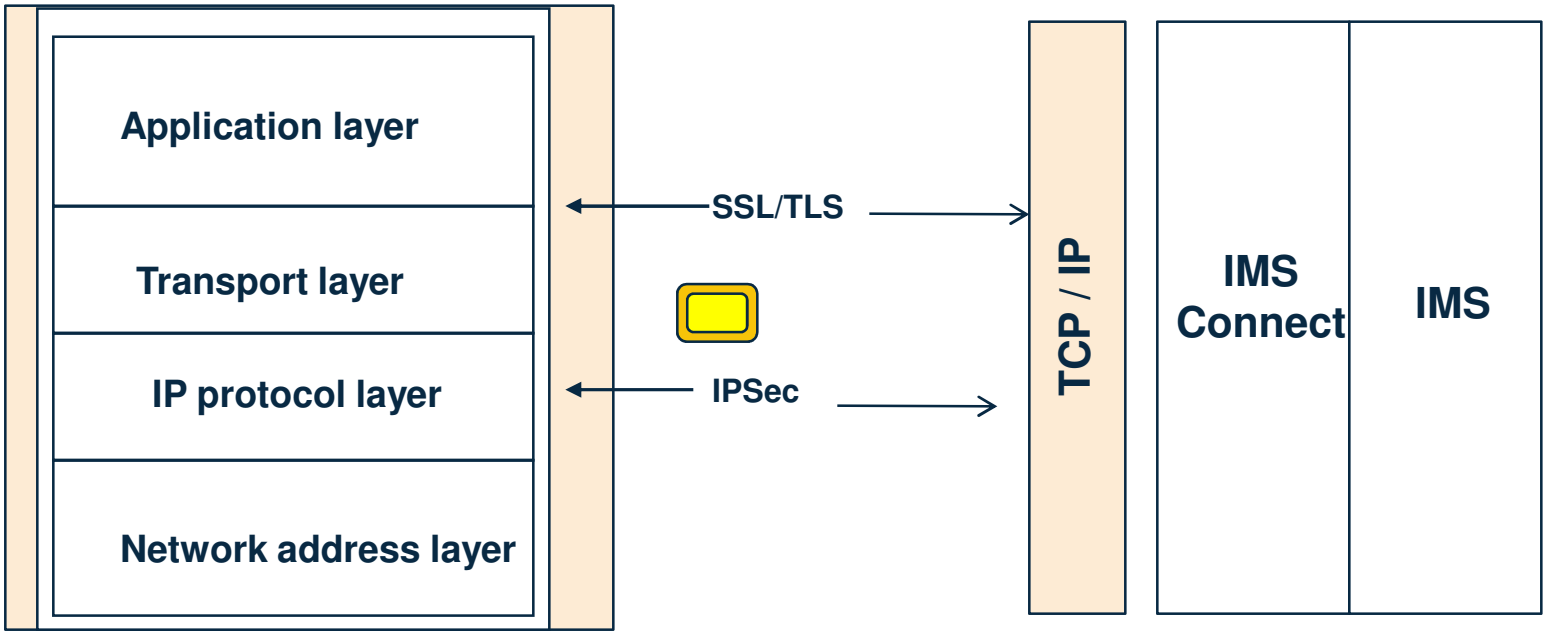


AT-TLS is activated by specifying the TTLS option in the TCPCONFIG statement block in the TCP/IP profile data

And … Why choose to use AT-TLS?

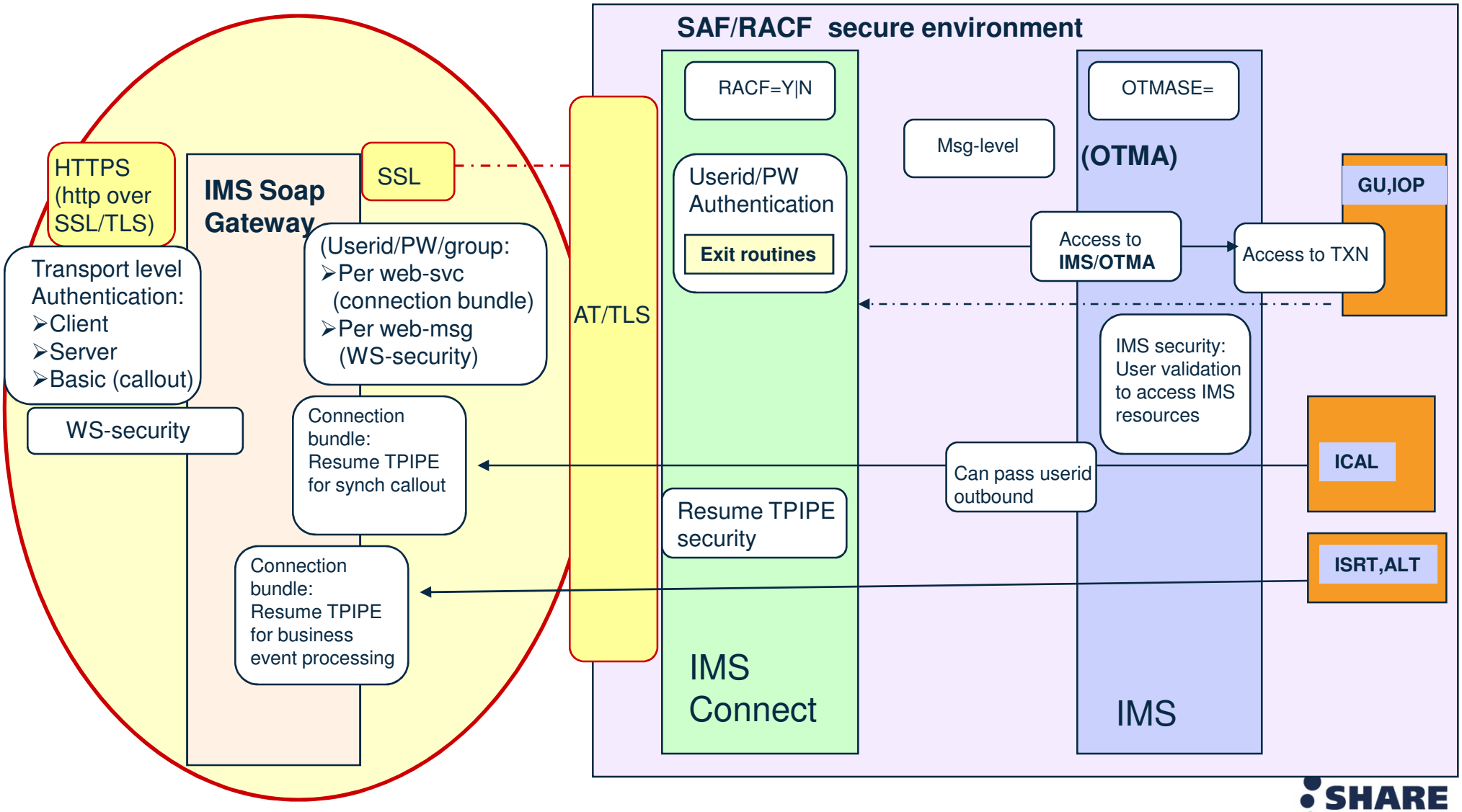
- Participation in AT-TLS is transparent to IMS Connect
  - IMS Connect can therefore be invoked by a remote client using TLS
    and
  - Rely on the z/OS TCPIP stack to perform the handshaking protocol to negotiate as well as perform all the require authentications and encryption
- Supports multiple ports
  - SSL support in IMS Connect is limited to a single port for the IMS Connect instance
- No additional configuration specifications in IMS Connect

How About IPSec



- IPSec is intended to protect traffic between two TCP/IP stacks, absolutely transparently to the applications, and can potentially protect any TCP/IP protocol that TCP/IP datagrams are carrying
  - It is an industry-wide adapted protocol, and you can expect interoperability between different platforms
  - It provides device-to-device type of security with peer-to-peer authentication and supports all protocols
- AT-TLS is intended to protect traffic between specific client and server applications, as well as between the TCP/IP stacks to which these applications are bound
  - It provides application-to-application security (protects specific applications/ports) with server-to-client or client-to-server types of authentication

IMS Soap Gateway Security



IMS Soap Gateway

- Supports HTTPS connections with clients and SSL/AT-TLS with IMS Connect

- Transport-level (connection) security between remote client and IMS SG
  - Server authentication
    - During the SSL handshake, the server sends a certificate to the client to authenticate itself
      - *Client authenticates the identity the certificate represents*
        - Certificate contains a public key and the cryptographic algorithms used in SSL
  - Client (*Mutua*l) authentication
    - Server authentication (making it mutual) ***plus*** the requirement for the client to send its certificate to the server for authentication

* Certificates come from a trusted CA (Certification Authority)
  - They are exchanged at the transport level to establish trust before the connection can be established or a web service invoked

IMS Soap Gateway...

- Basic authentication (for IMS as a web service consumer, e.g. IMS callout)
  - When IMS Soap Gateway is the client, the server that hosts the web service may require basic authentication credentials in order to call the remote service
  - Connection bundle *optional* properties
    - *Basic authentication user ID: Specifies the user ID to send to the server that hosts the web service for basic authentication*
      - *basic authentication password*
    - *Callout truststore name: Specifies the fully qualified path name of the truststore on SOAP Gateway that stores the certificates of trusted external web service servers(required for client or server authentication)*
      - *Trustore password*
    - *Callout keystore name: Specifies the fully qualified path name of the keystore on SOAP Gateway that stores the trusted client certificates for a callout application to authenticate with a target web service (Required for client authentication)*
      - *Keystore password*
  - Security certificates can be sent at the transport level for server authentication or client authentication

IMS Soap Gateway ...

- IMS SG support for the *IMS as a provider* scenario
  - Authentication of users on either a per-web-service or per-message basis

    - **Per-web-service**
      - *Userid and password are specified in the connection bundle (properties that specify IMS SG to IMS Connect connection)*
        - » *All requests for that service send the same userid to IMS*

    - **Per-Message**
      - Support for WS-Security
        - » Userid and password are enclosed as tokens in the WS-Security header in each message
          - > Requests can reflect different userids (cont'd ....)

WS-Security (Web Services Security or WSS) is a published SOAP extension standard (XML-based) that allows security (authentication and authorization) information to be exchanged in support of web services. Its goal is to protect the integrity and confidentiality of a message as well as the ability to authenticate the sender. The protocol specifies how to enforce integrity and confidentiality on messages and supports a variety security token formats, e.g., UNTP, SAML, x.509 certificates, kerberos tickets, etc Of the various security token formats supported, IMS Soap Gateway allows UNTP and SAML.

IMS Soap Gateway ...

- IMS SG support for the *IMS as a provider* scenario (contd)
  - Authentication of users on either a per-web-service or per-message basis ...
    - **Per-Message ...**
      - » Security tokens supported for WS-Security header (only one type per web service)
        * UsernameToken Profile (UNTP) 1.0 user name tokens
          - User name and password in the message header
        * Security Assertion Markup Language (SAML) 1.1 and 2.0 unsigned sender-vouches tokens
          - Minimal sender-vouches SAML assertion. No signatures or certificates are required.
        * SAML 1.1 and 2.0 signed sender-vouches tokens with two trust types:
          - Token is signed by a Security Token Service (STS) or signed by sender
          - IMS Soap Gateway can be configured to:
            Trust any - any valid security certificate in the SOAP header is allowed.
            Trust one - the security certificate in the SOAP header must be configured with the server trustore path and password

  - Use of WS-Security supports a custom authentication module that can perform additional checking by using a Java Authentication and Authorization Service (JAAS) module

IMS Soap Gateway ...

- IMS SG support for the *IMS as a Consumer* scenario
  - Synchronous Callout - Supports callout to web services that require authentication of users on a per-web service or per-message basis
    - ***Per-message***
      - *Userid is enclosed as a token in the WS-Security header in each message*
        - *Originating Userid (PSTUSID) for the IMS synchronous callout application is passed to the external web service for further authentication and authorization*
      - Security tokens supported for WS-Security header (only one type per callout request)
        - *SAML 1.1 unsigned sender-vouches tokens*
        - *SAML 2.0 unsigned sender-vouches tokens*
    - ***Per-web service***
      - *Userid used is what is specified in the connection bundle*
    - When WS-Security is enabled, you can also provide your own custom authentication module to perform additional checking by using a JAAS module
  - Business event processing (asynchronous callout)
    - Security on a transport level – Client, Server, or Basic authentication

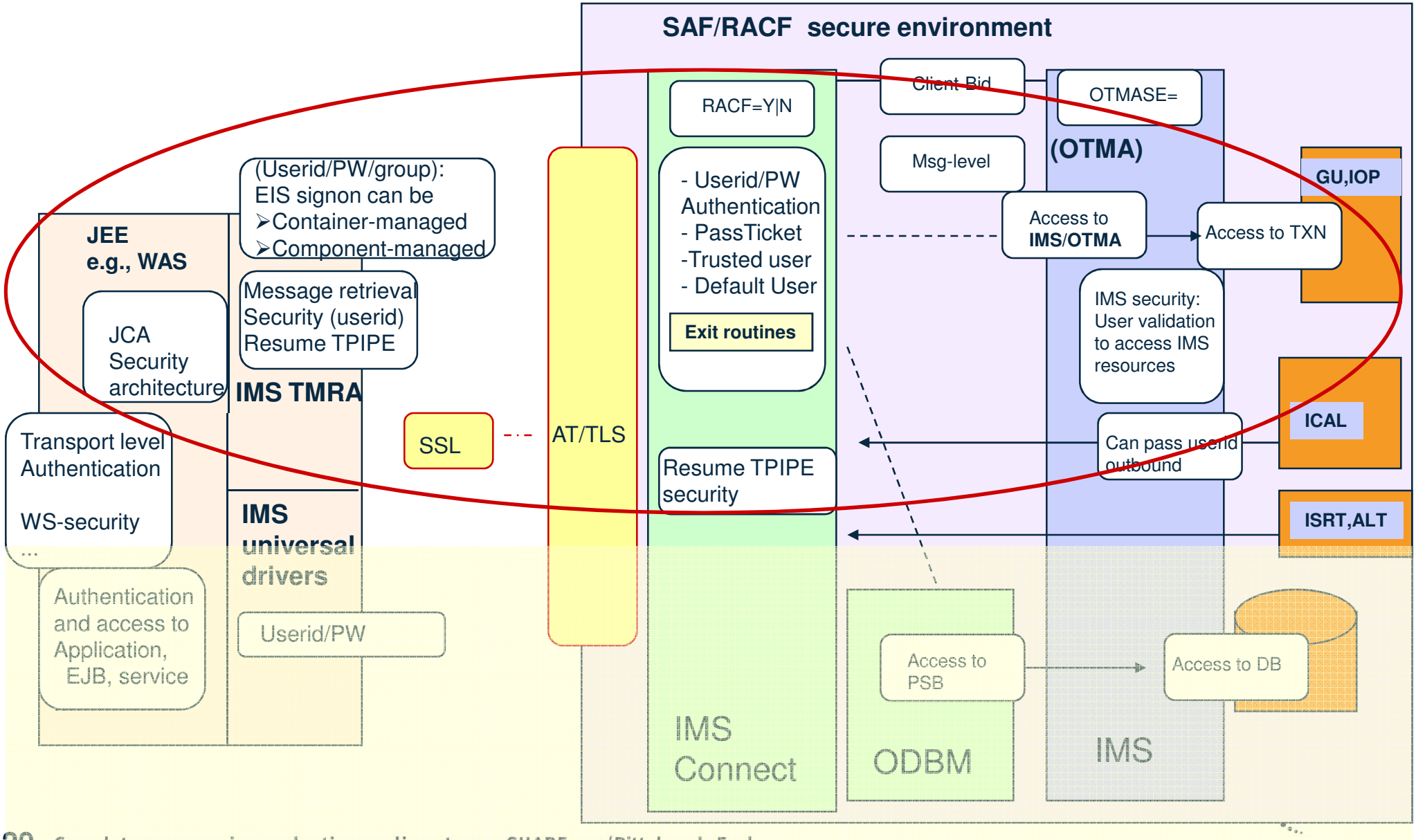
IMS Soap Gateway > IMS Connect > OTMA

- *IMS Connect*
  - When WS-Security is enabled, depending on the token type, SOAP Gateway passes the following information to IMS Connect:
    - For user name tokens: userid, password, and the payload data
      - *if IMS Connect security is enabled (RACF=Y)*
        - *IMS Connect authenticates the user ID and password*
        - *Passes userid and data to OTMA. IMS Connect does not pass any password information to OTMA.*
      - *If IMS Connect security is disabled (RACF=N)*
        - *Passes on the userid and data to OTMA without authentication*
    - For SAML tokens, SOAP Gateway passes the user ID and the payload data
      - *IMS Connect security must be turned off because SAML tokens do not contain password information*
        - *If IMS Connect security is turned on, the authentication will fail*
  - When WS-Security is disabled
    - IMS SG passes the userid and password information in the connection bundle for the web service to IMS Connect
      - *As above, IMS Connect actions depend on the RACF= specification*

IMS Soap Gateway > IMS Connect > OTMA

- *OTMA*
  - If OTMA security is enabled (OTMASE={CHECK|PROFILE|FULL}), OTMA authorizes the user to access transactions or OTMA commands
  - If OTMA security is set to OTMASE=NONE, then no authorization check is performed
  - For callout requests (asynchronous or synchronous)
    - Resume TPIPE processing (connection bundle) can invoke Resume TPIPE security in IMS (RIMS class and DFSYRTUX exit)

IMS TM Resource Adapter (IMS TMRA)



JEE Environment

- A java platform based on a standard architecture for developing and running mainframe-scale software, including network and web services, and other large-scale, multi-tiered, scalable, reliable, and secure network applications
  - IBM WebSphere Application Server (WAS) implements this framework
    - Supports transport-level (connection) security
      - *HTTPS, SSL, etc.*
        - *Client, Server, and Basic authentication*
    - Hosts applications – EJBs, MDBs, servlets, JSPs,...
    - Provides the ability to authenticate credentials and ensure access to hosted components are authorized
    - Provides secure connections from WAS applications to EIS systems, e.g., IMS
      - *Secure connections using SSL, SLL-AT/TLS*
      - *Propagation of secure credentials to the EIS for each message*
        - *IMS TM Resource Adapter can be deployed in WAS*

Note: a more comprehensive environment than the IMS Soap Gateway

JEE - WAS basics

- Secured access into WAS
  - Authentication
    - A requesting entity,e.g. web client, may be required to provide proof of identity
      - *When an end-user access WAS login, some information has to be provided to prove the user's authenticity*
        - *userid/password, an X509 certificate from an SSL session, or a single sign-on token from a browser*
    - This information is either authenticated or validated (credentials are authenticated; tokens are validated)
    - As resources are being accessed on the login thread, the subject is used in the server where the authentication took place to make authorization decisions
  - Identity Assertion
    - A relaxed form of authentication that does not actually require proof of identity, but rather accepts the identity based on a trust relationship with the entity that vouches for the asserted identity

NOTE: Allows WAS to not only provide transport (connection) security to the remote client but also authenticate client credentials and authorize access to the application that will eventually use the IMS TMRA to connect to the IMS environment

JEE - WAS basics...

- The JCA security architecture extends the end-to-end security model for JEE-based applications to include integration with EISs (e.g., IMS)
  - Supports the specification that WAS and IMS must collaborate to ensure that only authenticated users are allowed access to the IMS environment
    - through a set of system-level contracts such as:
      - *Connection management: enables WAS to pool connections to IMS (IMS Connect) for a scalable environment that can support a large number of clients*
      - *Transaction management: enables WAS manage transactions across multiple resource managers*
      - *Security management: reduces security threats and protects access to IMS*
- IMS TM resource adapter
  - Follows the Java EE Connector Architecture (JCA) security architecture, and works with the WebSphere Application Server (WAS) security manager

WAS – IMS TMRA

- Connectivity between IMS TMRA and IMS Connect
  - Transport Level: recommendation is to use AT/TLS with IMS Connect
  - Message Level: Supports passing the userid/password/groupid authentication credentials that are supported by IMS Connect
    - Supplied either by
      -
      - *The WAS application component (*component-managed signon*)*
      - *Or by the application server (*container-managed signon*).*

IMS TMRA

- *IMS as a provider* scenario
- Container-managed signon:
  - Relies on the security manager in the application server to provide and manage the security information
    - Uses the directive <res-auth>Container</res-auth> specified in the deployment descriptor of the application to provide the userid, password, groupid
  - Local Option
    - This is a z/OS-only feature in which both WAS and IMS Connect are running in the same z/OS image
      - *WAS authenticates the user based on the security information that is defined in the container-managed alias*
        - *Creates and passes a user token that represents the authenticated user to IMS TMRA which passes the token to IMS Connect*
    - Alternatively,
      - *WAS configuration can request that the user identity that is associated with the current thread of execution be used during user authentication*
        - *No need to specify a JAAS container-managed authentication alias in the J2C connection factory that is used by the application.*

IMS TMRA ...

- *IMS as a provider* scenario (contd)
- Component-managed signon:
  - Relies on the application (the component) in WAS to provide and manage the security information to be used for signing on to IMS Connect
    - Uses the <res-auth> element in the resource reference of the deployment descriptor of the application
    - Provides the security information (user ID, password, and optional group name) in IMSConnectionSpec object and passes it to IMS TMRA
      - *IMS TMRA passes this security information to IMS Connect for use in signing on (authentication and authorization)*
  - Note:
    - If theapplication is generated by a Rational or WebSphere development environment, the security information is passed as application input data
      - *To pass the security information as input data the userName, password, and groupName properties of the IMSConnectionSpec class must be exposed*
    - If the application does not use one of the methods to provide security information, WAS obtains the security information from the J2C connection factory custom properties

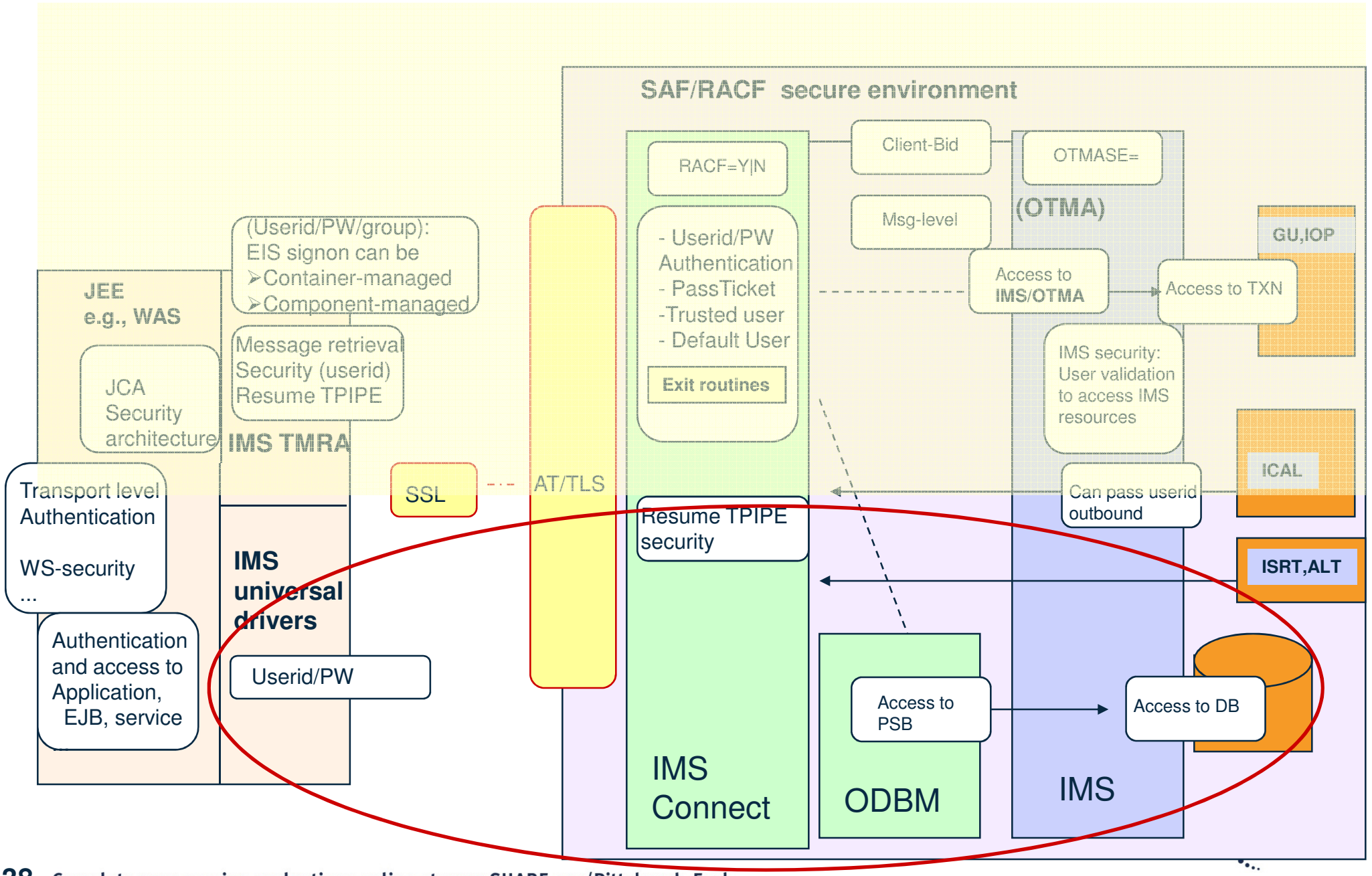
IMS TMRA – IMS Connect

- When WAS/IMS TMRA connects from a distributed platform or from z/OS with TCP/IP:
  - With either component-managed signon or container-managed signon:
    - If RACF=Y in IMS Connect
      - *IMS Connect authenticates the userid/password (SAF call)*
        - *Successful authentication results in passing the userid, optional group, and UOKEN to IMS OTMA for authorizing access to IMS resources*
    - If RACF=N in IMS Connect
      - *No authentication is done.*
        - *However, if the message header contains login information, then the userid and optional group name are passed to IMS OTMA for authorization to access IMS resources*
- When WAS on z/OS uses Local Option with Container-managed signon
  - Authentication is performed only by the application server and not IMS Connect
    - Regardless of the RACF setting in IMS Connect
      - *WAS calls SAF/RACF to create the user token*
      - *IMS TMRA passes the user token to IMS Connect*
      - *When IMS Connect sees the user token, it passes the user token to IMS OTMA to authorize access IMS resources*

IMS TMRA

- *IMS as a consumer* scenario
  - IMS callout requests (synchronous ICAL or asynchronous) are retrieved from IMS Connect by using the Resume TPIPE call
    - Resume TPIPE security ensures that the userid associated with the Resume TPIPE is authorized against the TPIPE
    - If security is enabled and the tpipe does not exist at the time the RESUME TPIPE call is issued, the call is rejected.
  - For message-driven beans (MDBs)
    - SSL authentication is supported for communication with IMS
    - Security information is specified in the J2C activation specification (IMSActivationSpec) that is configured in WAS
  - For non-MDB applications
    - Userid must be specified in the connection specification of the WAS application or the connection factory that is used by the application

Open DB Security



Open DB Security

- IMS TM Resource Adapter is used to access IMS transaction and command resources using OTMA
- The IMS Universal DB resource adapter (driver) provides JDBC SQL access to IMS data in a JEE environment such as WebSphere Application Server (WAS) on any platform
  - Access to IMS DBs use IMS Connect and ODBM
    - IMS Connect provides authentication of the userid/password sent in by the IMS Universal drivers on WAS
- IMS Connect to ODBM
  - RACF=Y
    - IMS Connect authenticates the Userid/Password/Group
      - *Passes a RACF Object (RACO) to ODBM*
    - ODBM uses this information for security
  - RACF=N
    - IMS Connect bypasses authentication and does not pass a RACO
    - ODBM used the ODBM Job Userid/Group

Open DB Security...

- ODBM to IMS
  - Security information is either the RACO from IMS Connect or, if no RACO then it is the userid/group from the ODBM jobcard

  - ODBM and RRS=Y
    - ODBM uses the ODBA interface to IMS
      - *Creates and passes ACEE in the Thread TCB*

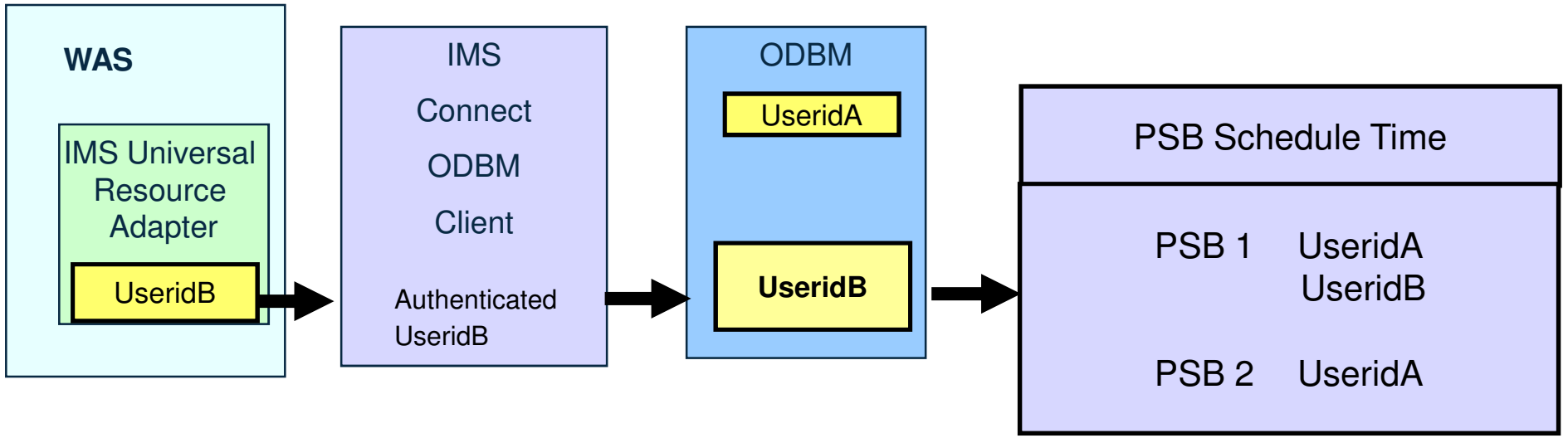
    - In IMS, ODBASE parameter is in effect
      - *ODBASE=Y invokes APSB security*
        - *IMS uses RACF to verify the Userid using the AIMS or Axxxxxxx resource class*
        - *The ISIS parameter is not used*
      - *ODBASE=N invokes RAS*
        - *IMS uses the ISIS parameter to determine the RACF call using the IIMS or Ixxxxxxx resource class*
        - *ISIS=N – No RACF checking*
        - *ISIS=R – RACF call*
        - *ISIS=C – DFSRAS00 exit*
        - *ISIS=A – RACF call and DFSRAS00 exit*

Open DB Security...

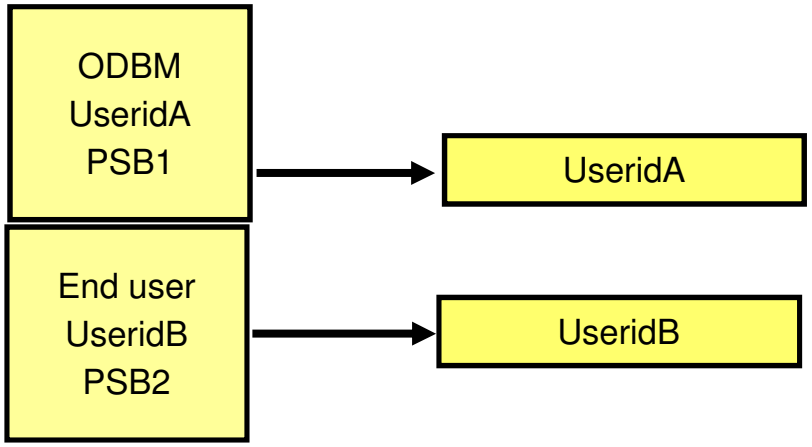
- ODBM to IMS (contd)...
  - ODBM and RRS=N
    - ODBM uses the CCTL interface to IMS (like CICS)
      - *Pass Userid/Group in PAPL*
    - In IMS, the ISIS parameter to determine the RACF call using the IIMS or Ixxxxxxx resource class
      - *ISIS=N – No RACF checking*
      - *ISIS=R – RACF call*
      - *ISIS=C – DFSRAS00 exit*
      - *ISIS=A – RACF call and DFSRAS00 exit*

Open DB Security...

- Example



Use of resource classes AIMS or IIMS|JIMS is based on use of SAF/APSB versus RAS
Or optionally the DFSRAS00 exit decision when using RAS



Can only access PSB1

The Bottom Line

- Multiple levels of security
  - OTMA
    - Validates whether an OTMA member (IMS Connect) can communicate with IMS
    - Implements transaction and command security
      - *Userid that flows in on a message against the IMS resource*
    - Supports callout to web services
  - ODBM
    - Passes security information to IMS for database access
  - IMS Connect
    - Supports the authentication of userids, groups, passwords and passes the utoken to IMS with the message
    - Additionally extends the security authentication
      - *PassTicket support*
      - *Trusted User support*
  - Network – connection security and encryption
    - SSL – TLS
    - AT-TLS