Java IC Installation

Oracle FLEXCUBE Universal Banking

Release 14.6.2.0.0

Part No. F72916-01

[November] [2022]

Table of Contents

1. Java IC Installation

1.1 Introduction

This document lists steps to configure Application Server for JAVA IC Integration with FCUBS.

1.2 Prerequisites

Java IC installation requires a Weblogic domain.

Note:

a. In the following sections, 10.10.10.10 IP address and 1010 port are used as an example. Please use valid IP and Port of corresponding server.
b. In case of upgrade from previous release, upgrade scripts if present under UPGRADE folder has to be applied.

1.3 Server Setup

Java IC Setup includes two sets of services:

1. **INFRA Services:** There are two services under this category.
   a. **Discovery Service:** This service is required for Java IC Services Registration. On start-up all Java IC services will be registered with Discovery Service. The registered services can make inter service calls by making use of Discovery Service.
      Service Name: plato-discovery-services.war

   b. **Config Service:** All the configuration related details will be stored in a database table (table name: PROPERTIES). Config service provides the required configuration details for the corresponding Java IC Services during service start up.
      Service Name: plato-config-services.war

2. **Java IC Services:** These Services are Java IC Functional Services. E.g.: CALC Service, ACCR service, LIQD Service etc.

INFRA services and Java IC Services must be deployed on two separate Managed Servers (Any name can be given to Managed Servers).

1. **ConfigServer:** In this managed server, INFRA Services should be deployed (plato-discovery-services.war and plato-config-services.war).
2. **JavaICServer:** In this managed server, all the Java IC services should be deployed.

Following Data Sources have to be created for INFRA and Java IC Services:

Data Source JNDI Name	Type	Targets
jdbc/OBIC	Non-XA Datasource	JavaICServer
jdbc/FCUBS	Non-XA Datasource	JavaICServer
jdbc/PLATO	Non-XA Datasource	JavaICServer, ConfigServer
jdbc/PLATOBATCH	Non-XA Datasource	JavaICServer

Below line must be included in setDomainEnv.cmd or setDomainEnv.sh of the Weblogic domain:

For Linux Server:

```
JAVA_OPTIONS="${JAVA_OPTIONS} ${JAVA_PROPERTIES} -Dflyway.enabled=false
-Dspring.flyway.enabled=false  -
Dplato.services.config.uri=http://<config-server-ip>:<config-server-
port> -Dplato.service.logging.path=<Debug Path where Logs are to be
written> -Dserver.id=<server id>”

export JAVA_OPTIONS
```

E.g.:

```
JAVA_OPTIONS="${JAVA_OPTIONS} ${JAVA_PROPERTIES} -Dflyway.enabled=false
-Dspring.flyway.enabled=false -
Dplato.services.config.uri=http://10.10.10.10:1010 -
Dplato.service.logging.path=/mnt/FC144/ICLogs -Dserver.id=1”

export JAVA_OPTIONS
```

For Windows Server:

```
set JAVA_OPTIONS=%JAVA_OPTIONS% %JAVA_PROPERTIES% -
Dplato.services.config.uri=http://<config-server-ip>:<config-server-
port> -Dflyway.enabled=false -Dspring.flyway.enabled=false -
Dplato.service.logging.path=<Debug Path where Logs are to be written>
-Dserver.id=<server id>
```

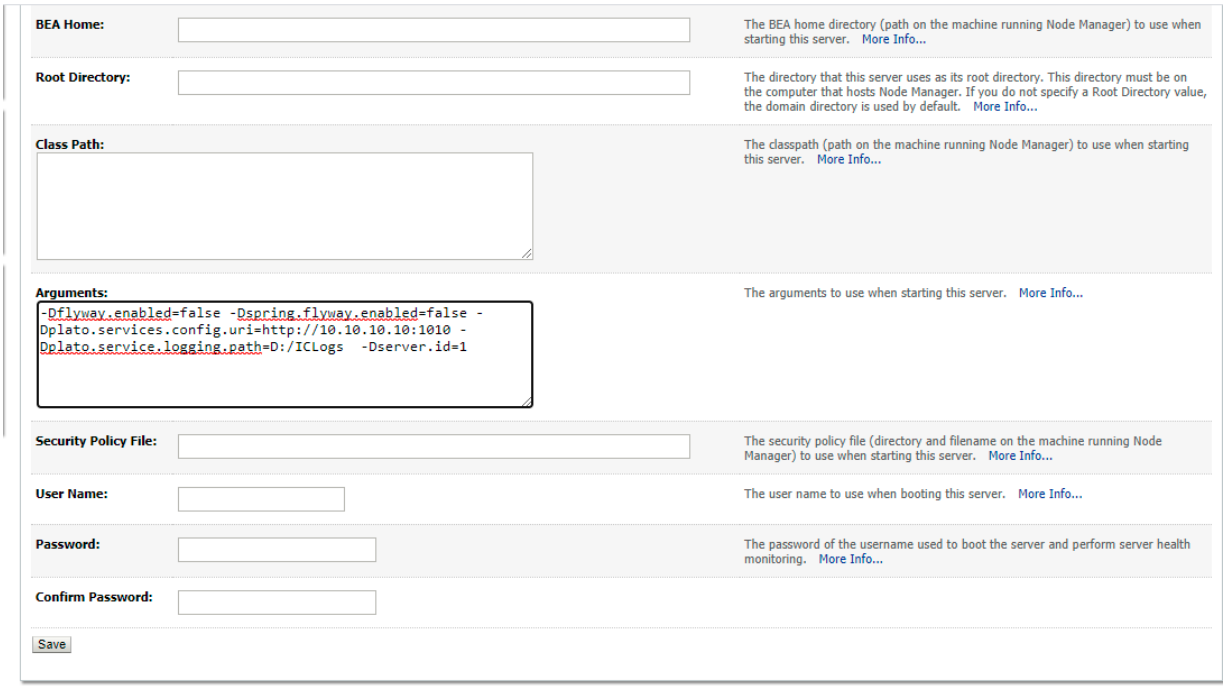
E.g.:

```
set JAVA_OPTIONS=%JAVA_OPTIONS% %JAVA_PROPERTIES% -
Dflyway.enabled=false -Dspring.flyway.enabled=false -
Dplato.services.config.uri=http://10.10.10.10:1010 -
Dplato.service.logging.path=D:/ICLogs  -Dserver.id=1
```

Note:
The parameter mentioned below also needs to be added
`- Dspring.cloud.loadbalancer.ribbon.enabled=false`

server id parameter should be a number used to uniquely identify an application instance. If only one deployment of a service is present they this value has to be set to 1. In case of multiple deployment, number from 1 to the number of instances can be assigned to the server where deployment is done.

Alternatively, if the parameters are to be set specific to a Managed Server where Services are deployed, then these properties can be set in Servers->Managed Server->Server Start in the argument section. Note: It will be useful only if Node-Manager is used to start managed servers.



1.4 WAR Deployment after Build

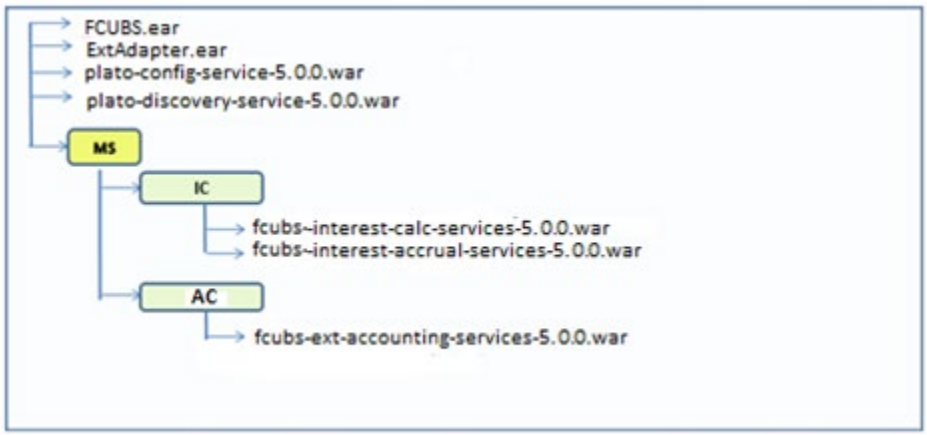
As part of FCUBS EAR build, in addition to FCUBS EAR, Java IC wars and Java IC INFRA wars will get copied into the destination location.

Below are the locations where the wars will be copied after build:

1. **FCUBS Application EAR and All Adapter EARs:** Available in the destination folder.
2. **INFRA Service WARs:** plato-discovery-services war and plato-config-services war will be available in the destination folder.

   Deploy all the INFRA Service WARs in **ConfigServer**.
3. **Java IC Service WARs:** All the Java IC Service WARs will be copied in “IC” folder under the destination folder.

   Deploy all the Java IC Service WARs are in **JavaICServer**.



Note:

fcubs-interest-allocate-services, fcubs-charge-calc-services and fcubs-interest-batch-services wars currently do not support multiple deployments. Only one instance of these services are to be deployed.

1.5 Order of Server Start

After deployment or server restart, services have to be started in following sequence:

a. plato-config-service

b. plato-discovery-service

c. Java IC Services

When servers are restarted, ensure to start **ConfigServer** first and then then **JavaICServer**.

On every restart of **ConfigServer**, plato-discovery-service must be stopped and started. This is required as Discovery requires properties entries for self-registration to be picked from plato-config-service.

In order to check if all the services have started, below discovery URL can be checked:

http://<config-server-ip>:<config-server-port>/plato-discovery-service

E.g.:

http://10.10.10.10:1010/plato-discovery-service

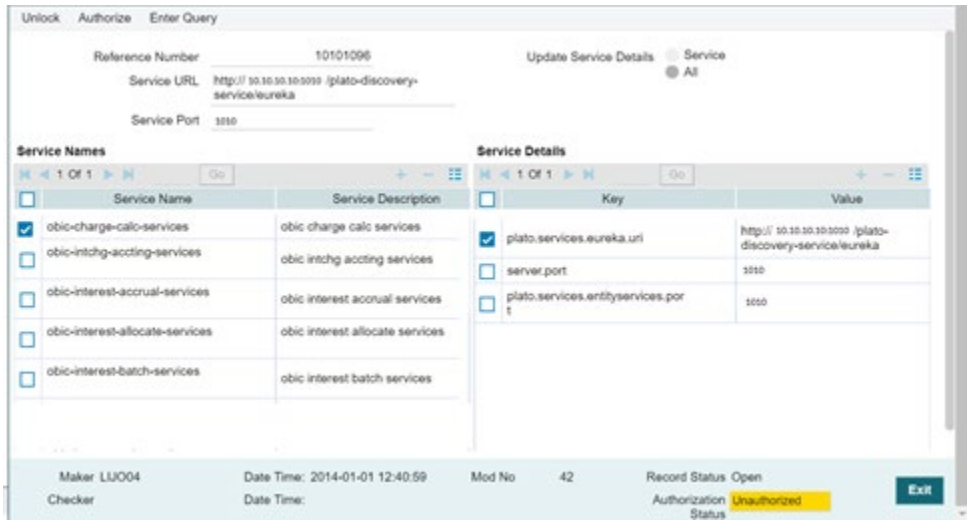
All the deployed Java IC Services should get listed in the service discovery URL.

2. Java IC Maintenance in FCUBS

2.1 Required Maintenance for Java IC

Below maintenances are required in FCUBS

1. Properties Maintenance (CSDPROPM):
   a. Launch the screen and query for entry present in LOV for Reference Number:



   b. Unlock the screen, Select All for “Update Service Details” and update the Service URL and Service Port to as below:

Key	Value
plato.services.eureka.uri eureka.client.serviceUrl.defaultZone	http://<discovery-service-ip>:<discovery-port>/plato-discovery-service/eureka
server.port and plato.services.entityservices.port	Managed Server port where the service is deployed

Note:

a. Above properties are to be updated for all INFRA and Java IC Services.
b. If SSL setup is required for calls through discovery, below properties are to be updated: (This step is not mandatory)
   i. server.port: Update to SSL Port of the managed server where service is deployed.
   ii. plato.services.entityservices.port: Update to SSL Port of the managed server where service is deployed.
   iii. isSslEnabled: Value has to be set to true.
   iv. apiProtocol: Value has to be changed to https.
   v. nonsecure.port.enabled: value has to be false
   vi. secure.port.enabled: value has to be true

If step b has been followed for SSL Setup and if services are deployed on different

servers, please follow section 3 (SSL Setup with Self Signed Certificate, Scenario2) for ssl handshake between fcubs-interest-batch-service managed server and other services managed server.

2. External Service Maintenance (IFDEXSER):

   Prior to this step, user must maintain external system “OBIC” in CODSORCE screen.

   User has to query for External System “OBIC” in IFDEXSER and following details have to be modified:

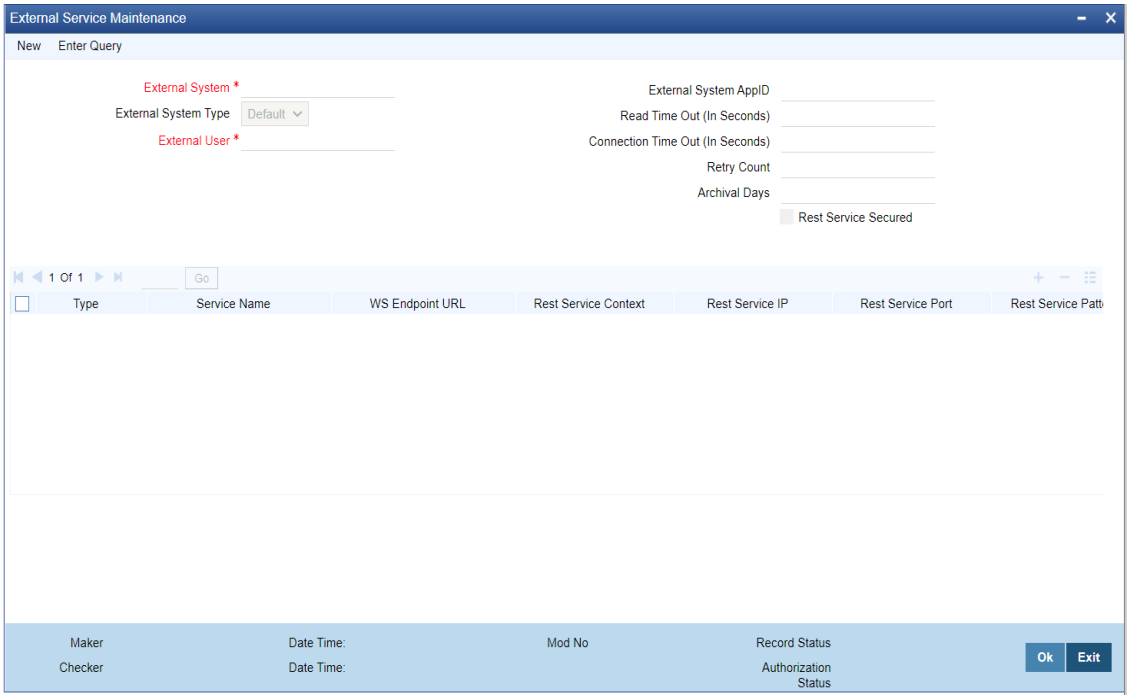
   a. Rest Service IP : The server IP where **fcubs-interest-batch-services.war** has been deployed.

   b. Rest Service Port : The Managed Server port where **fcubs-interest-batch-services.war** has been deployed.

      If SSL is enabled in FCUBS properties file,

      - Update Rest Service Port to SSL port of the managed server where **fcubs-interest-batch-services.war** has been deployed.
      - SSL configuration has to be done as per steps mentioned in section 3 (SSL Setup with Self Signed Certificate, Scenario1).

   c. External User: User ID of the Oracle FLEXCUBE Universal Banking user used for invoking the Java IC Services.



Note: Only Rest Service IP, Port, and the external user have to be updated. Values for other fields shouldn’t be modified.

Maintain the details as follows to perform the maintenance in the External Service Maintenance (IFDEXSER) screen:

- **Type:** REST request
- **External System:** OBIC
- **System Type:** OBMA
- The user must specify **Rest Service IP** & **Rest Service Port** of the server where service is deployed.
- The user must specify the **Rest Service Context**, and **Rest Pattern** as given in the below table.

Function id	Rest Service Context	Service name	Rest Pattern
ICDOLIQ/ ICDLIQAC	obic-online-liquidation-services	OBICLiqacService	onliq/liquidateOnlineUBS
ICDCALAC	obic-interest-calc-services	OBICIntCalcService	intCalc/multipleAccountOnlineCalculation
ICDMCALC	obic-interest-calc-services	OBICIntCalcServiceM	intCalc/multipleAccountOnlineCalculation
ACDENTRY	fcubs-post-accounting-services	OBICDeferredHandoffService	postaccounting/deferredhandoffUBS

3. External Service Maintenance (IFDEXSER):

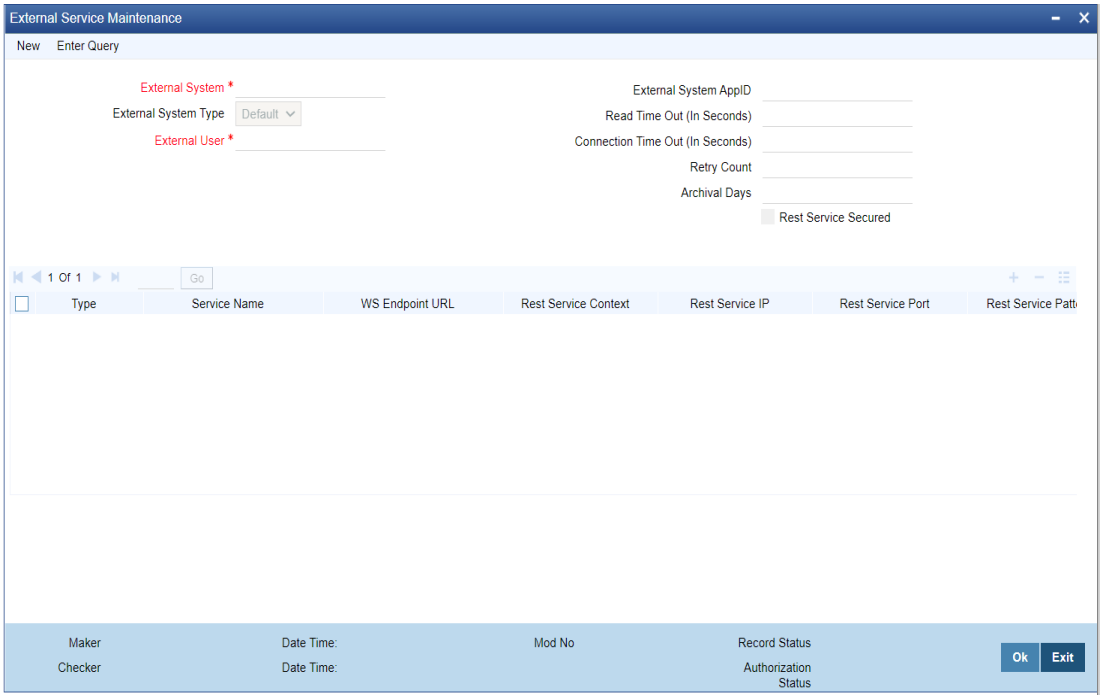
   Prior to this step, the user must maintain external system “FCJAVA” in CODSORCE screen. The user has to query for External System “FCJAVA” in IFDEXSER and the following details have to be modified:

   a. Rest Service IP : The server IP where **fcubs-co-batch-services.war** has been deployed.
   b. Rest Service Port : The Managed Server port where **fcubs-co-batch-services.war** has been deployed.

   If SSL is enabled in FCUBS properties file,

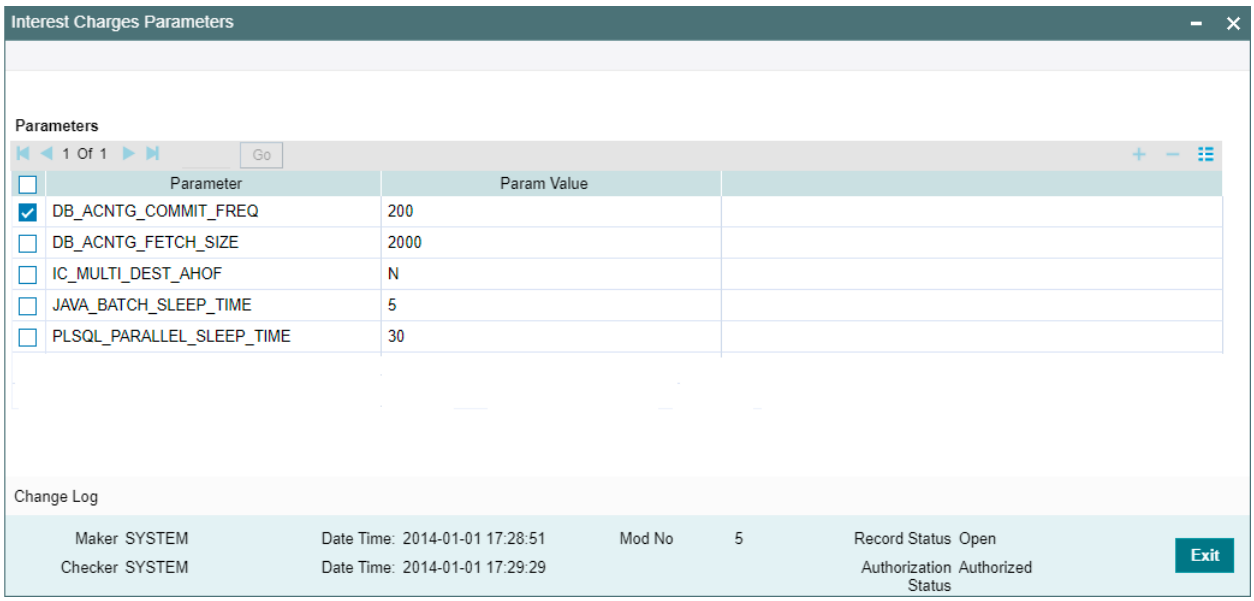
   - Update Rest Service Port to SSL port of the managed server where **fcubs-co-batch-services.war** has been deployed.
   - SSL configuration has to be done as per steps mentioned in section 3 (SSL Setup with Self Signed Certificate, Scenario1).

   c. External User: User ID of the FLEXCUBE user FCUBSUSER is used for invoking the Java IC Services.



4. IC Param Maintenance (ICDPARAM):

   Launch the screen and unlock and modify the parameters.



Below are the parameters which can be configured as per requirement:

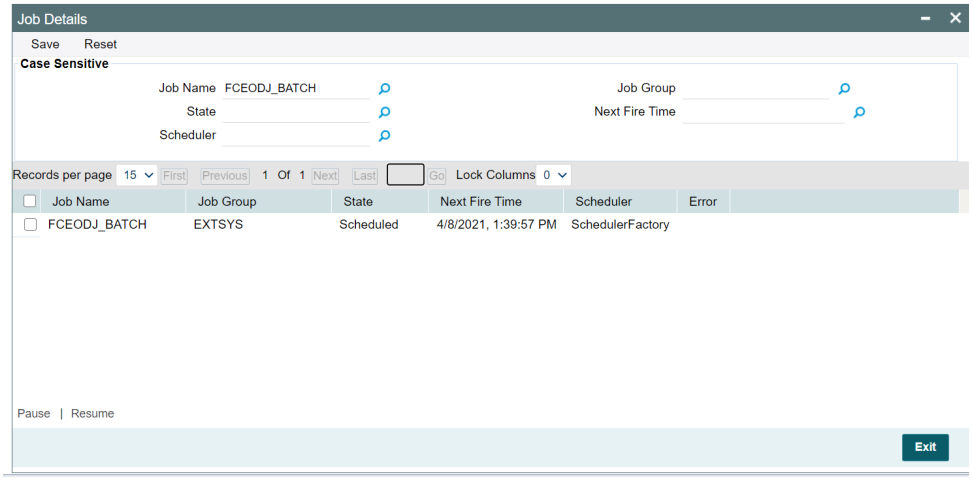
PARAM_NAME	PARAM_VAL	Description
JAVA_BATCH_SLEEP_TIME	5	Sleep time in seconds to verify the status of Java IC service submitted

SKIP_OBIC_ACNTG_ERR	O	**O** -Mark the accounting failures and complete the EOC batch, **E** - Fails the EOC batch when getting any accounting failures.
IC_JOB_SLEEP_TIMER	30	Sleep time to check the status of IC parallel streams - Conventional IC
JAVA_RETRY_COUNT	150	Maximum retry count to fail the EOC batch when the submitted java service is not picked up by scheduler
RESOLVE_MAX_TRY_WITHOUT_FAIL	5	Maximum retry to obtain account lock for resolution
DB_ACNTG_COMMIT_FREQ	200	IC Accounting Commit Frequency
DB_ACNTG_FETCH_SIZE	2000	IC Accounting Fetch Size

5. PLATO_LOGGER_PARAM_CONFIG has to be updated with the log path for IC logs corresponding to LOG_PATH param value.
6. After the above maintenances, restart FCUBS Application and all the servers in the order mentioned in the section 1.5 Order of Server Start.

2.2 Scheduler Job for Triggering IC EOD in FCUBS

Scheduler Job “FCEODJ_BATCH” has to be scheduled for IC EOD in Flexcube. After the above maintenances are done, resume FCEODJ_BATCH Job from SMSJOBBR screen before triggering FCUBS EOD:



Note:

1. FCEODJ_BATCH Job Scheduler interval is set by default as 5 seconds.
2. FCEODJ_BATCH Job has been released with start-up mode as Manual. Hence after every deployment of FCUBS application or restart of server, the job needs to be manually scheduled.

3. Before triggering UBS EOD job kindly ensure that FCEODJ_BATCH Job is running.

3. SSL Setup with Self Signed Certificate

Please follow this section for below configurations:

Scenario1: If SSL is enabled for FCUBS Application, the call to fcubs-interest-batch-services will be in SSL mode. This requires SSL Configuration to be done in both the FCUBS Server and the OBIC Server.

Scenario2: If SSL is to be enabled for calls through discovery service and services are deployed on different managed server. SSL handshake would be required between fcubs-interest-batch-service managed server and other services managed server.

SSL Configuration can be done with Self Signed Certificate in non-production environment only. Since SSL Handshake would be required between the two servers, below steps can be followed in order to setup self signed SSL Setup:

1. Run the below command to create keystore for each of the servers.
   To create keystore for FCUBS and OBIC server, below command has to be run. This will create keystore in the specified path:

   ```
   keytool -genkey -keystore /path/to/keystore/server1.jks -alias
   <server1_cert_alias> -
   dname "CN=<server1_server_host>,OU=<organization>" -keyalg "RSA" -
   sigalg "SHA256withRSA" -keysize 2048 -validity <noOfDays>

   keytool -genkey -keystore /path/to/keystore/server2.jks -alias
   <server2_cert_alias> -
   dname "CN=<server2_server_host>,OU=<organization>" -keyalg "RSA" -
   sigalg "SHA256withRSA" -keysize 2048 -validity <noOfDays>
   ```

   In the above commands server1 and server2 has been used to indicate two servers involved in handshake.

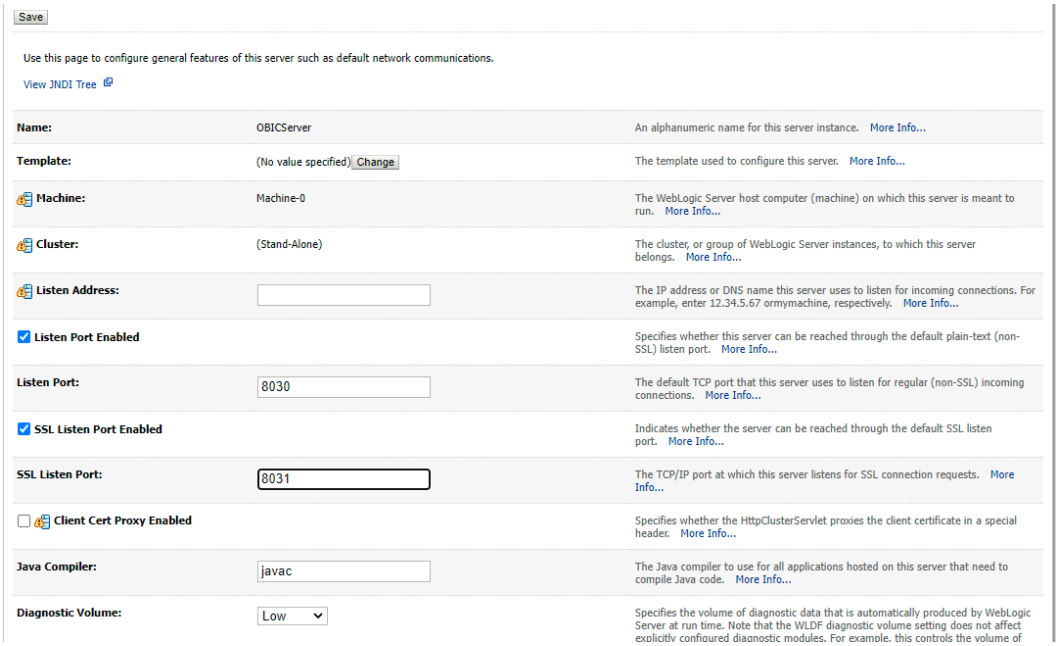
   For Scenario1, server1 is the server where scheduler application is deployed and server2 is the server where fcubs-interest-batch-services is deployed.

   For Scenario2, server1 is the server where fcubs-interest-batch-services is deployed and server2 is each of the managed server where IC services are deployed. If SSL Configuration is already done for fcubs-interest-batch-services server, then Keystore need not be created again and only step involving certificate import to trust needs to be done.

   <server1_cert_alias> Any alias name can be provided here. Alias name shouldn't be repeated.
   <server2_cert_alias> Any alias name can be provided here. Alias name shouldn't be repeated.
   <organization> has to be replaced with the organization code.
   <noOfDays> has to be replaced with validity days of the certificate.
   <server1_server_host> ip of the server1 can be mentioned here.
   <server2_server_host> ip of the server2 can be mentioned here.

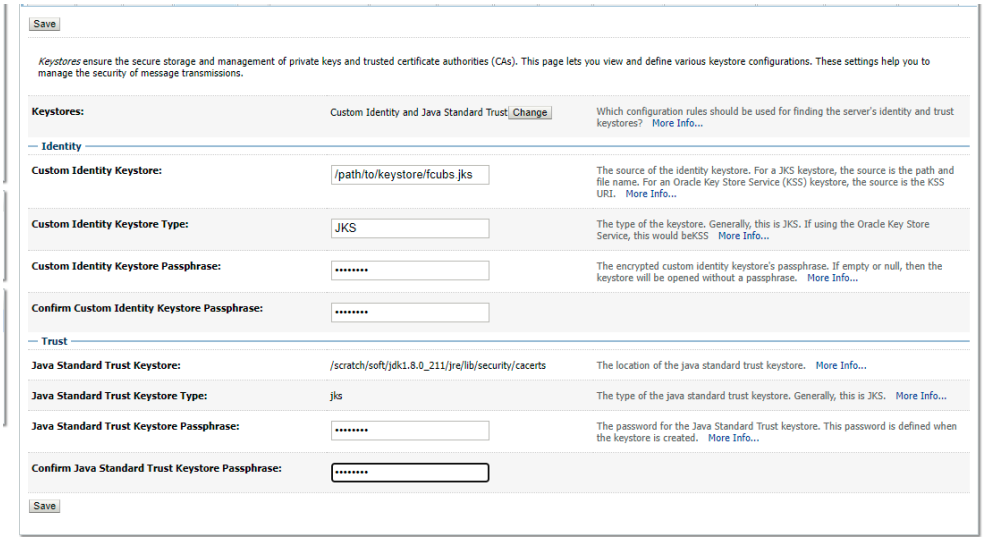
   User will be prompted to enter password while running the above command. The same passphrase has to be entered in the further steps.

2. Configuring SSL in Weblogic server. This step has to be repeated for both the servers. Check "SSL Listen Port Enabled" Flag and enter SSL Listen Port

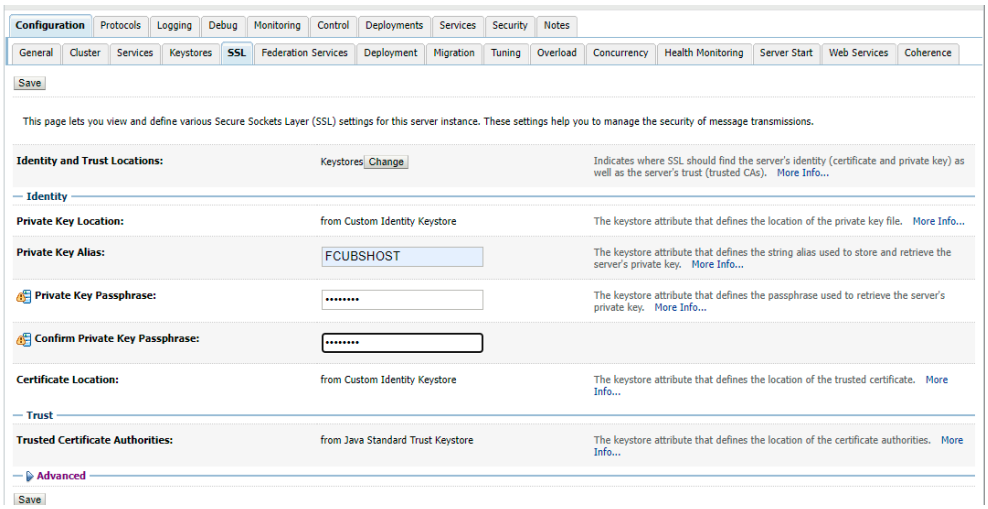


Switch to Keystores tab and follow below steps:

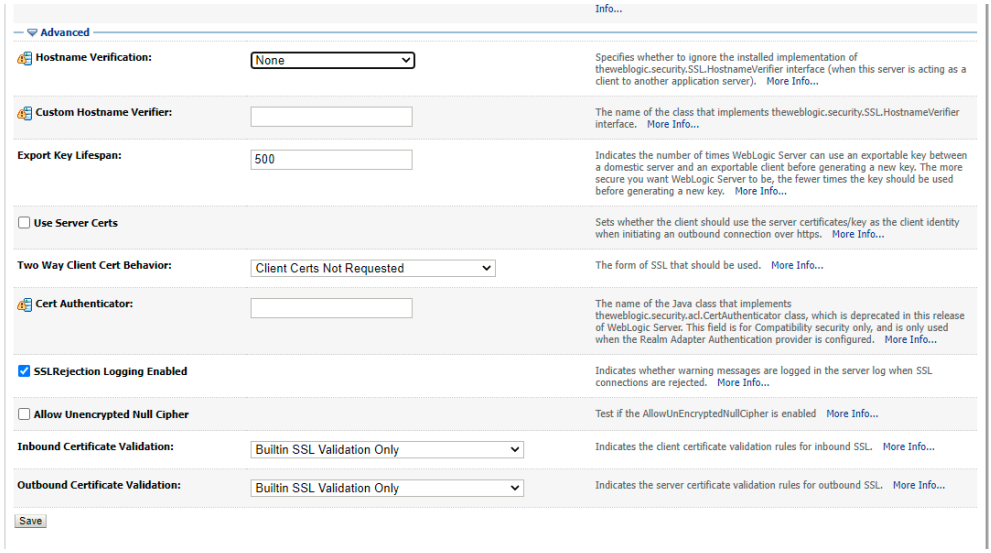
a. Change Keystores option to "Custom Identity and Java Standard Trust"
b. For Custom Identity Keystore, enter the keystore file path.
c. For Custom Identity Keystore Type, enter JKS.
d. For Custom Identity Keystore Passphrase and Confirm Custom Identity Keystore Passphrase, enter the passphrase entered when creating keystore.
e. For Java Standard Trust Keystore Passphrase and Confirm Java Standard Trust Keystore Passphrase, enter passphrase as "changeit".



3. In SSL tab, do the below changes:
   a. Enter Private Key Alias as entered while creating keystore.
   b. For Private Key Passphrase and Confirm Private Key Passphrase, enter the passphrase entered when creating keystore.



Click “Advanced” block in the SSL Tab and set Hostname Verification to "None"



4. Run below command for each of the servers to extract certificate from the corresponding keystores:

```
keytool -export -v -alias <server1_cert_alias> -file
/path/to/cert/server1.cer -keystore /path/to/keystore/server1.jks

keytool -export -v -alias <server2_cert_alias> -file
/path/to/cert/server2.cer -keystore /path/to/keystore/server2.jks
```

<server1_cert_alias> Any alias name can be provided here. Alias name shouldn’t be repeated.
<server2_cert_alias> Any alias name can be provided here. Alias name shouldn’t be repeated.

5. Since SSL Handshake will be done between server1 and server2, the extracted certificate from the keystore of both the servers are to be imported into Trust Store of the corresponding servers. In step 2, since Java Standard Trust has been selected as the Trust store, corresponding certificates are to be imported into Java Standard Trust of the server. server1 Certificate has to be imported into server2 Java Standard Trust and server2 certificate has to be imported into server1 Java Standard Trust in order for the SSL Handshake to be successful. Below command has to be run to import the certificate in to Java Standard Trust store "cacerts" file in the path mentioned in the "Java Standard Trust Keystore" path taken by weblogic in Step 2 for both the servers.

   ```
   keytool -import -v -trustcacerts -alias <server1_cert_alias> -file
   /path/to/cert/server1.cer -keystore
   /path/to/jdk/jre/lib/security/cacerts

   keytool -import -v -trustcacerts -alias <obic_cert_alias> -file
   /path/to/cert/obic.cer -keystore
   /path/to/jdk/jre/lib/security/cacerts
   ```

   <server1_cert_alias> Any alias name can be provided here. As a practice, we can set hostname of the server1 server.

   <server2_cert_alias> Any alias name can be provided here. As a practice, we can set hostname of the server2 server.

   For Java Standard Trust Keystore, default password will be "changeit"

4. IC End of Day Batches

Following batches must be maintained for Interest processing.

For End OF Transaction Input stage following batches must be maintained in the given order. Other batches of EOC in this stage should have sequence number less than IC batch sequence number (below listed IC batches should be after all non IC batches).

EOC Group	Batch Name	Module	Frequency	Maintenance order
End OF Transaction Input	ACBCUTOF	AC	D	1
End OF Transaction Input	ICBCUTOF	IC	D	2
End OF Transaction Input	ICJRPBAT	IC	D	3
End OF Transaction Input	ICBRESOL	IC	D	4
End OF Transaction Input	TDJEOD	TD	D	5
End OF Transaction Input	ICBEOD	IC	D	6
End OF Transaction Input	ICJACPST	IC	D	7
End OF Transaction Input	DABHOFF	AC	D	8

No Other batch should be configured in between the above batches and all the batches of EOC in End OF Transaction Input stage should be of lower sequence number.

For Beginning of the day stage following batches to be maintained in the given order. Other batches of EOC in this stage should have a sequence number less than these batches (below listed IC batches should be after all non IC batches).

EOC Group	Batch Name	Module	Frequency	Maintenance order
Beginning of the Day	ICJBOD	IC	D	1
Beginning of the Day	ICJDUCOL	IC	D	2

Beginning of the Day	TDJBOD	TD	D	3
Beginning of the Day	DABHOFF	AC	D	4

5. IC Additional Setup Details

The section is to provide details regarding IC setup, so it helps teams in configuring IC with Weblogic Application Server.

5.1 IC Configurations

This section describes the required IC configurations for tuning the application.

5.1.1 IC Services: Number of Processes, Number of Deployments for a service, Commit Frequency and Fetch Count

Number of Processes spawned by IC Services, Fetch Count & Commit Frequency can be configured for IC Services.

Max Process: Number of processes to configure for a service (per deployment).

Fetch Count: Number of records picked up for execution by a process.

Commit Frequency: System will commit after processing these many number of records.

Note: Here by processes we mean the number of parallel processes spawned by the Service and not about OS level processes or threads.

e.g. If for Calc Service Max Process is 20, Fetch Count is 10000 and Commit Frequency is 200 then once Allocation Service has allocated records for Calc, processing would be as follows:

- Max Process (20) * Fetch Count (10000) = 200,000, hence maximum 200,000 record's will be updated in Allocation table for a branch (*maximum is mentioned as its possible there are less than 200,000 records available for the branch to process*), this would happen as part of a single parent process in Calc Service.
- Then 20 processes will be spawned to process records updated in previous step.
- Each Process will pick up maximum 10000 records (as Fetch Count is 10000) and process it and commit after every 200 records (as Commit Freq is 200).
- This will happen for each Calc Service deployed.

Configuring Max Process, Fetch Count & Commit Frequency.

Max Process: Value of max process can be set between 8 to 40.

Fetch Count: Fetch Count can be set between 5000 to 10000.

Commit Frequency: Commit Frequency can be set between 100 to 500, setting it to 200 is ideal for bulk processing.

5.1.1.1 Number of Deployments for a service

To Scale out IC services, multiple deployments of IC Services can be done. To achieve the same, you can configure additional managed server and deploy IC service which you want to scale (e.g. Calc is deployed on 8 managed servers & accrual is deployed on 4 managed servers etc.).

For example, if you have 4 services deployed for Calc and Max Process is set to 20 then ideally 20 * 4 = maximum 80 processes for Calc will be processing at any given point of time. Also, each of these deployments of Calc service (based on max process-20 in this case) will initially pick up a branch for processing (so with 4 services deployed 4 branches will be processed parallelly).

You will deploy number of services depending on the system throughput requirement. Also, rather than increasing max process beyond 40, it is better to add one more service deployment and reduce number of processes per deployment.

Note: You need not deploy 1 service for each branch. E.g. if you have 100 branches for processing and you wish to process maximum 5 branches at any given point of time then you can deploy 5 instances of service.

Interest Batch Service, Allocation Service, Resolution Service (if volume expected is less) & Charge Service (if charge volume is less) can be deployed on a single managed server. Other services like Calc, Accr, Liqd & IC accounting can be deployed either 1 or 2 services on a single managed server.

After configuring Max Process, Fetch Count & Commit Freq, if there is no performance constraint or bottleneck then to further improve throughput you can add deployment for a given service and monitor to see if throughput is increasing or not. By doing this you can reduce overall processing time.

Recommendations:

- Calc service involves heavier processing than Accr service, hence it is recommended to deploy more Calc Services than Accr Services.
- Accounting service will also need to have similar or higher deployments than Calc Service.
- If number of branches is high then it is recommended to deploy more services rather than increasing Max Process for the service, as each deployment can cater to a branch.

5.1.2 Server-Port settings in case of multiple deployments for a service

For each service, managed server's port value is set in Properties Maintenance (CSDPROPM) 'server.port' key. While having multiple deployments this might require different handling, depending on the setup. Port details can be set at managed server level, in which case the entry for key 'server.port' should be deleted. To set it at managed server level, argument -Dserver.port can be set through either Server Startup Arguments or by setting it in setUserOverrides.sh.

e.g. -Dserver.port=13009 //Where by 13009 would be the managed server's port.

Check below points to identify your case and decide approach accordingly:

- If you have managed servers on different physical servers and you want to have same port for a given service on all physical servers, then you need not delete entry from properties maintenance and you can continue with same port for all deployed services (e.g. Calc Service is deployed on 8 different managed server, each on a different VM and managed server is having same port across all 8 VMs)
- In any other case, like having multiple managed servers on same physical server OR having multiple managed servers each of a different physical server but with a different port number, then you need to delete entry for 'server.port' from properties maintenance for that service and set -Dserver.port explicitly.

5.1.3 Plato Batch Logging & Persistence Logging

The default value for Plato Batch Logging & Persistence Logging for IC services is set such that it will not log details, this is to avoid overhead caused by these loggings. Properties Maintenance (CSDPROPM) screen reflects these values. Value for key 'platobatch.inMemoryJobRepository' should be true so logging is only to memory and not persisted, similarly value for key 'platobatch.persistenceLogReqd' should be false so persistence logs are not written.

5.2 Weblogic Application Server Configurations

This section describes about the required Weblogic configurations.

5.2.1 Data Source Configuration

Connection Pool Statement Cache Size & Connection Pool Max Capacity should be set as recommended in Weblogic Server Best Practices document, kindly refer the same.

5.2.2 Number of deployments for IC service

Refer section 5.1.1.1 Number of Deployments for a service under IC Configuration.

Java IC Installation
[November] [2022]
Version 14.6.2.0.0

Oracle Financial Services Software Limited
Oracle Park
Off Western Express Highway
Goregaon (East)
Mumbai, Maharashtra 400 063
India

Worldwide Inquiries:
Phone: +91 22 6718 3000
Fax: +91 22 6718 3001
https://www.oracle.com/industries/financial-services/index.html