

Overview of Foreign System Interface Server

The Foreign System Interface server (SCP 385) receives transactions from external systems through Open Engine, translates the data, and then calls the appropriate services to insert or update the *Cerner Millennium* database.

Operating Dependencies

Operating dependencies are the set of conditions that must be in place for a server to function correctly. This section describes the operating dependencies for the Foreign System Interface server (SCP 385). *Cerner Millennium* servers interact with each other in a variety of ways, and they depend on each other to process a unit of work. For a high-level overview of this server's interactions with other *Cerner Millennium* servers and other elements of the *Cerner Millennium* architecture, see the requests diagram below.

Server Control Panel

The Server Control Panel (SCP) allows you to start and stop servers and to change the properties of a server. SCP allows you to view the number of server instances that are running and the state of those instances.

Server Definition - AIX

The **show** command at the SCP (SCP) prompt displays the definition of the indicated server on an *AIX* system.

Server Definition - HP-UX

The **show** command at the SCP prompt displays the definition for an indicated server on an HP-UX system.

Services

This server offers the following shared services:

ExternalSystemsInbound offering the following transactions:

Transaction Number	Transaction Name	Description	Service Call Procedure
1201999	ESI Message	Processes messages from external systems.	RPC

Server Properties

Most parameters for a server are specified in SCP. The following table contains server properties for the Foreign System Interfaces server.

Property Name	Description	Default Value	Platform (AIX or HP-UX)
Data Segment Size	The maximum data size for the process in bytes. This maps to the operating system's <i>data</i> ulimit.	167772160	AIX */HP-UX
Jvmargs	Memory allocated at startup Max memory allocation	-Xms64M -Xmx128M	AIX*/HP-UX

Jvmargs	XX: SchedulerPriorityRange <scheduler>,<base>,<top> or <scheduler> or <scheduler>,<base> or <scheduler>,<,>,<top> This option can be used to both select the scheduling policy and map the Java™ thread priorities, 1 (low) through 10 (high), to the underlying HP-UX thread priorities	-XX: SchedulerPriorityRange= SCHED_NOAGE, -228,-218	HP-UX
Jvmars	UseParallelGC :The parallel garbage collector (UseParallelGC) throws an out-of-memory exception if an excessive amount of time is being spent collecting a small amount of the heap.	-XX:GCTimeLimit= <i>time-limit</i> and -XX:GCHeapFreeLimit= <i>space-limit</i>	HP-UX

RDBMS

The Foreign System Interface server accesses and requires the following tables:

- CODE_VALUE_EVENT_R
- CONTRIBUTOR_SYSTEM
- ESI_ALIAS_TRANS
- ESI_ENSURE_PARMs
- ESI_LOG
- LONG_BLOB
- ORG_ALIAS_POOL_RELTN
- ORGANIZATION
- PERSON_ALIAS
- SI_SPECIAL_CONFIG_OPTIONS
- TIME_ZONE_R

Code Sets

The following code sets are used by the Foreign System Interface server:

Personnel Alias TypeDELIVERED, ERROR, IN ERROR, IN PROGRESSPharmacy Identifier TypeScheduling EEM Verification StatusFSI Surescript Error

Code Set Number	Code Set Name	CDF Meaning(s)
4	Person Alias Type Code	See the FSI Patient Registration Server guide for the list of supported CDF Meanings from this code set.
8	Auth Status	AUTH, MODIFIED
13	Comment Source	ESIGENERATED
14	Comment Type	ORD COMMENT, RES COMMENT
15	Country Code	
21	Event Action	MODIFY, VERIFY
23	Document Format	AH
25	Doc Storage	BLOB
27	Ethnic Group Code	
34	Medical Service Code	
36	Language Code	

38	Marital Status Code	
43	Phone Type Code	See the FSI Patient Registration Server guide for the list of supported CDF Meanings from this code set.
48	Record Status	ACTIVE
49	Religion Code	
50	Interp Method	
52	Result Interp	
53	Event Class	DATE, DOC, GRP, MBO, MED, NUM, TXT, UNKNOWN
54	Units Of Measure	UNKWNUNIT
57	Sex Code	
59	Specimen Danger	
62	State Code	
63	Succession Type	UNKNOWN
64	Susceptibility Interp Results	
65	Susceptibility Methods	
67	VIP Code	
71	Encounter Type Code	
72	Event Code	
73	Contributor Source	CLIANBR, OID
74	County Code	
87	Confidentiality Level Code	ROUTCLINICAL
89	Contributor System	CCRDOCSYS, CDADOCSYS
102	Event Subclass	UNKNOWN
103	Action Status	COMPLETED, PENDING, REQUESTED, UNKNOWN
200	Order Catalog	
212	Address Type Code	See the FSI Patient Registration Server guide for the list of supported CDF Meanings from this code set.
213	Person Name Type Code	See the FSI Patient Registration Server guide for the list of supported CDF Meanings from this code set.

220	Location Code	
221	Service Resource	
226	Species Code	
263	Alias Pool Code	
268	Deceased Code	
278	Organization Type	
281	Phone Format Code	
282	Race Code	
287	Student Code	ALLPRSNL
317	ESI Alias Field	
319	Encounter Alias Type	See the FSI Patient Registration Server guide for the list of supported CDF Meanings from this code set.
320	Personnel Alias Type	SPI
325	ESI Alias Filter	
326	ESI Ensure Type	
333	Encounter Personnel Relation	CONSULTDOC
354	Financial Class Code	
400	Source Vocabulary	
1004	Susceptibility Detail	GENERICINT, GENERICNUM
1011	Antibiotics	
1021	Organisms	
1028	Body Site	
1901	Result Status	
2051	Specimen Containers	
2052	Specimen Type	
2054	Collection Priority	
2058	Collection Method	

3401	RxAudit Status	DELIVERED, ERROR, IN ERROR, IN PROGRESS
3576	Pharmacy Identifier Type	
6000	Catalog Type	GENERAL LAB
11000	Identifier Type	
14003	Discrete Task Assay	
14093	ESI Org Alias Cd	
14113	String Result Format	UNKNOWN
14128	Prsnl Proc Opt Code	FTVALENS, SKIPPRSNL
14650	Citizenship Code	
14651	Veteran Military Status Code	
14652	Nationality Code	
15769	ESI Special Alias Processing	ADDRESSSNAP, AOFEVENTDESC, DEPTSVCRE, ENCINTRTYPE, MICOVRDVERF, NAMESNAP, PHONESNAP
16089	ESI Result Processing	BLDSIGNLINE
18089	ESI OBX Processing	CULTSTAT, EDEF, EDESC, EDISP, MBOTAG, NOSUSCHART
18749	Event Alias Type	CE_ACCESSION
19172	ESI DAW Code	
23023	Scheduling EEM Verification Status	ERROR, RETURNED
23056	Contact Method Code	TEL
27400	ESI Error Status Code	FAILURE, RETRY, SUCCESS, TERMINATE, WARNING
27401	FSI Surescript Error	INTPROCERR, UNKREJCD
27403	FSI RxHub Error	DENIAL, NODRUGS, UNKNOWN
29520	Entry Mode Code	ESI
4002244	Result Code Assignment Method	ARG_DB
4002266	Unmatched Person Status	UNMATCHED

Discern Explorer (CCL) Scripts

The following table lists all *Discern Explorer* CCL scripts that are executed through the CPM Script server during request handling.

Script Name	Related Request Number	Bound to Server (SCP Entry ID)	Purpose
CORE_ENS_INBND_ALIAS	4171671	51	Ensures inbound alias during add on the fly processing
LOC_ADD_LOCATION	13000	51	Ensures a location
LOC_ADD_RES_PARENT_CHILD_R	13023	51	Associates a service resource to a location
LOC_ADD_SERV_RES	13001	51	Ensures a service resource
PM_ENS_ENCNTR_RELTN_W_PRSNL_WR	100309	51	Handles personnel match and ensure
USR_ADD_ADDRESS	11028	51	Ensures an address
si_ens_audit	1201106	51	Add/Update a row on the SI_AUDIT table for the transaction being processed
si_ens_spi	1200049	51	Adds the Surescripts Prescriber Index to the appropriate personnel.
bed_ens_erx_status	4411137		Updates the eprescribe_detail table with status of the Provider Directory transaction.
pm_sch_get_persons	100040	51	Returns a list of possible matched person(s)
eem_get_rx_med_hist_by_ident	4135921	51	Returns the Person ID, Health Plan ID and Payer Organization ID associated to the Transaction Identifier passed in the request.

Server Interactions

Processes making requests to the Foreign System Interface server as well as requests made to other servers by the Foreign System Interface server are documented below.

Requests Made to the Foreign System Interface Server

Sender of Request (Server/ Application)	Request Number	Request Description	Synch (S) or Asynch (A)	Steps Performed by CPM ESI Server	Data Returned to the Sender
Open Engine (Comserver)	1201999	ESIMessage	S	Process inbound message from external system	Status Block

Requests Made to Other Servers by Foreign System Interface Server

The table below displays requests made to other servers by the) Foreign System Interface Server (SCP 385):

Recipient of Request (Client or Server Application)	Request Number	Request Description	Synch (S) or Asynch (A)	Data Returned to the CPM ESI Server	Actions Performed by Foreign System Interface Server if Recipient Server is not Available
Clinical Event server	1000071	event_batch_ensure	S	Reply status including event_id	The server logs a retry message.

FSI Patient Registration Server	115540	EnrollPatientFSI	S	Status Information; person_id if successful	The server logs a retry message.
FSI Patient Registration Server	115541	EnsurePatientFSI	S	Status Information	The server logs a retry message.
FSI Patient Registration Server	115565	AdmitEncounterFSI	S	Status Information; encntr_id if successful	The server logs a retry message.
FSI Patient Registration Server	115566	EnsureEncounterFSI	S	Status Information	The server logs a retry message.
Clinical Information - Messaging	967578	Add_RxAudit	S	Status of the call	Warning logged
Clinical Information - Messaging	967570	Update_RxAudit	S	Status of the call	Warning logged
Clinical Information - Messaging	967571	RxRenewal_Create	S	Status of the call/reasons for failure	
Prescription Benefits	3202501	Pharmacy_RetrieveBenefitsByIds	S	Information about the Pharmacy(ies) that matched the ID(s) sent in the request.	Logs error, send outbound ERROR message to Surescripts
Prescription Benefits	4135250	StoreRxHistoryTransactionResponse	S	Status of the call	Warning logged
Order Management	680210	Orders_AddClaims	S	List of Successful, Duplicate or Failed claims	Retry Logged
FSI ESO-CQM Server	1215034	FSI.CQM_EsoInsertNcpdpError	S	Queue ID for new message	

Troubleshooting This Server

This section provides troubleshooting information specific to this server.

Troubleshooting Transactions

In *Cerner Millennium*, an application server can accept one of two types of transactions: Remote Procedure Call (RPC) transactions or Reliable Datagram Model (RDM) transactions.

An RPC server accepts a request message from a client application, and it returns a reply message directly to the client in a synchronous transaction. An RDM server processes transactions asynchronously. It retrieves the transaction from a queue, but it sends no verification to the client application. The person and encounter service is RPC.

Troubleshooting the Queuing System

Information about troubleshooting the queuing system for this server is available in the [Enterprise Java Server Platform Configuration](#)

Locating and Understanding Error Logging

This server logs errors to the following log files in the CER_TEMP directory, where the instance is the server instance number:

- cmb_0385_<instance number>.log
- cmb_0385_<instance number>.err
- cmb_0385_<instance number>.out

Troubleshooting Steps for this Server

Follow the steps below when working through issues with this service.

- 1. Make sure a server instance offering the ExternalSystemsInbound Service is running on all required nodes.
- 2. Use Message Log Viewer (MsgView.exe) to determine if an error is found. Use the command **select cmb_0385** (where 0385 is the SCP entry number offering this service) to find the server instance that offers this service in the log. Use the command **show xxx** to get details about an error. The command **search -level error** is helpful when the file is very large.
- 3. Check the .LOG and .ERR files for the server in the CER_TEMP directory.

LOG file example

```
...
Caused by: com.cerner.system.enterprise.client.arctic.GeneralDomainCallException: Call failure: name =
PM_GET_ORG_BY_ENTITY_ID, domain = surround.northamerica.cerner.net, user = junituser, communication error
at com.cerner.system.enterprise.client.arctic.SrvCall$1.run(SrvCall.java:131)
at java.security.AccessController.doPrivileged(AccessController.java:224)
at javax.security.auth.Subject.doAs(Subject.java:495)
at com.cerner.system.enterprise.client.arctic.SrvCall.invoke(SrvCall.java:60)
at com.cerner.system.enterprise.client.arctic.ScriptCallImpl.call(ScriptCallImpl.java:155)
at
com.cerner.msvc.organization.sunspot.data.access.enterprise.OrganizationDAOImpl.findByUIDs(OrganizationDAOImpl.java:
com.cerner.data.access.framework.IdentifiableDAOProxy.findByUIDsWrapper(IdentifiableDAOProxy.java:214)
... 34 more
Caused by: com.cerner.system.enterprise.messaging.internal.transport.TimeoutException: This error may be caused by
unavailability of the [cpmscript] service in [surround.northamerica.cerner.net] or the presence of Websphere MQ
queues when the domain is not configured to use queue-based shared services. The latter issue can be addressed by
deleting any unused shared service queues.
...
```

Maximizing Performance

There are several things about a server that can affect performance and stability. The settings defined for a server affect performance, so it is beneficial to be aware of the amount of logging and additional processing a server is doing. Recommendations for settings that will maximize the performance of this server are detailed in this section.

CPU and Memory

Cache

The amount of data a server caches over time is an important indicator of server performance. Some servers cache data during start-up. These servers can process more efficiently once the data has been cached, but they typically have a longer start-up time. Also, servers cache frequently-used data over time as they process. Servers that cache data as they process handle transactions more quickly over time.

This server caches data from the following tables:

Table Name	Cached on Startup	Cached over Time	Coherency
code_value*	no	yes	expiration
code_value_alias**	no	yes	expiration
contributor_system	no	yes	expiration
esi_alias_trans	no	yes	expiration
esi_alias_parms	no	yes	expiration
code_value_event_r	no	yes	expiration

si_special_config_option	no	yes	expiration
location_time_zone_r	no	yes	expiration
organization	no	yes	expiration
org_alias_pool_reltn	no	yes	expiration

* Due to size, it is recommended that code_value information not be cached for the following code sets: 200, 220, 221, 14003

** Due to size, it is recommended that code_value_alias information not be cached for the following code sets: 200, 220, 221

Logging

The system messages logged by this server can slow the performance of the system. Logging increases the amount of I/O on the system and decreases the amount of available drive space.

Considerations for Multinode or Multiple-Instance Usage

This server operates in the Enterprise *Java* server framework, which allows the server to spawn a thread for each transaction. In contrast, traditional C++ *Cerner Millennium* servers operate in a purely single-threaded fashion. As a result, a single instance of a service on this server can process transactions in a manner similar to multiple traditional C++ servers.

Servers can be offered on multiple nodes and have multiple instances on each node. To ensure redundancy, it is recommended that you always maintain two instances of a server. This can be accomplished by maintaining one instance per node in a multi-node environment or by maintaining two instances per node in a single node environment.

To increase performance, no more than two instances of a server are recommended.

System Maintenance

System maintenance affects the performance and stability of the system. The following topics describe the types of system maintenance tasks related to this server.

Purge Programs

The following purge programs are required for the Foreign System Interface server (SCP 385):

Program	Frequency	Description
esi_purge_log_table	As needed	This program purges the ESI_LOG table for records greater than the number of days old specified. The default is four days old.

Audits and Reports

The following audits and reports can be used:

Audit or Report	Frequency	Description
ESI_AUDIT	As needed	This audit provides information useful for troubleshooting problems and performance issues.

Other Maintenance Tasks

No additional maintenance tasks are required for the Foreign System Interface server (SCP 385).