



Operations Dashboard User Manual

Sybase Money Mobiliser 5.1

DOCUMENT ID: DC01963-01-0510-01

LAST REVISED: February 2013

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Sybase Money Mobiliser

Sybase® Money Mobiliser is a state-of-the-art mCommerce solution that gives consumers the ability to bank, make payments, and transfer money through a mobile device. Money Mobiliser acts as an intermediary between a consumer and a member bank or third party vendors running Money Mobiliser.

Note: The current user interface is available in English language only.

Operations Dashboard

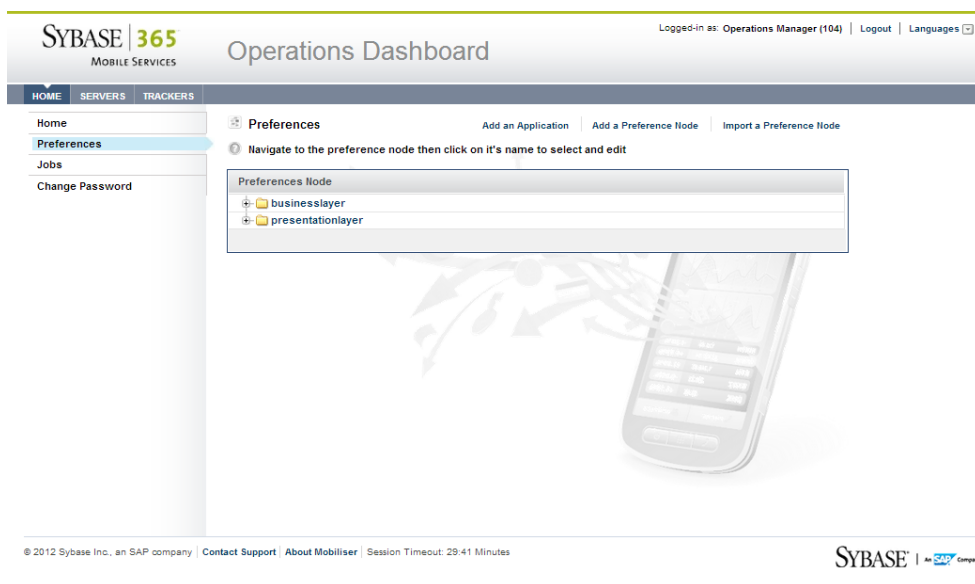
The Operations Dashboard provides system administrators a high-level operational view into Money Mobiliser. The dashboard aggregates the information to give you an overview on the application status, which aids in the operational support of the system. You can track individual statistics from your servers for monitoring the performance and general operational efficiency.

Note: The portal feature descriptions and illustrations pertain to the out-of-the-box version of Money Mobiliser.

Preferences

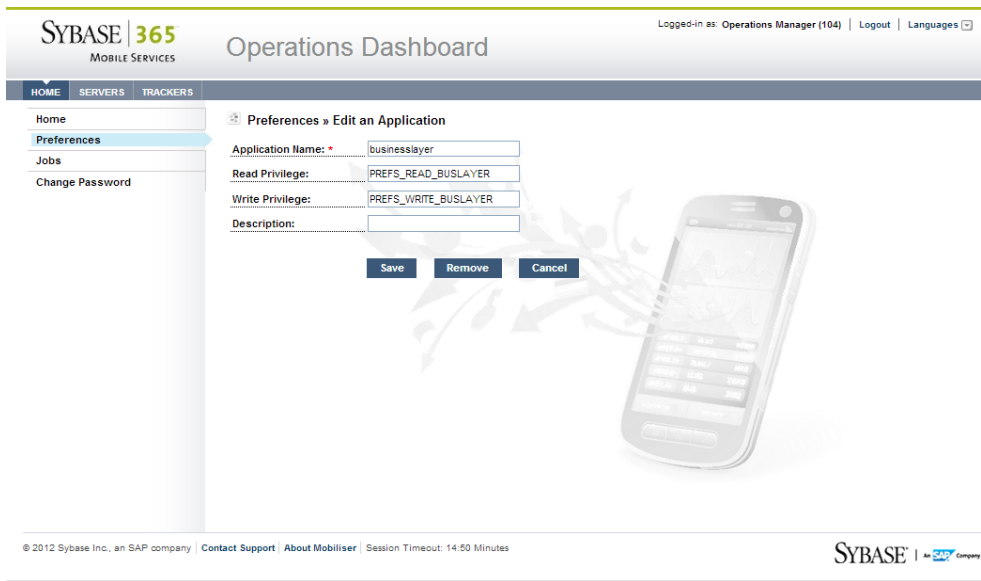
Preferences are the standard mechanism for application configuration in Money Mobiliser. Use the Preferences option to manage operation-level configuration data such as timeouts, retries when communicating with other systems, and thread pool sizes. The standard Money Mobiliser installation comes with two applications: `businesslayer` and `presentationlayer`.

You can add applications and preference nodes. Additionally, you can import the node information from an XML file, which contains the application name, path of the node, and preference keys and values. When you import the data it is added to the path of the node indicated in the XML file.




Applications

Preferences can be defined for multiple applications, each with a unique name and access rights. The application must have a unique name and may optionally have a description. You can define read or write privileges or both for the application. If read or write privileges are not defined, any user invoking Money Mobiliser services can retrieve or set preference values. You can also edit or remove applications.



The screenshot displays the Sybase 365 Operations Dashboard. The top navigation bar includes the Sybase 365 logo, the title 'Operations Dashboard', and user information: 'Logged-in as: Operations Manager (104) | Logout | Languages'. Below this is a secondary navigation bar with 'HOME', 'SERVERS', and 'TRACKERS'. A left sidebar contains links for 'Home', 'Preferences' (highlighted), 'Jobs', and 'Change Password'. The main content area is titled 'Preferences » Edit an Application' and contains a form with the following fields: 'Application Name:' (value: businesslayer), 'Read Privilege:' (value: PREFS_READ_BUSLAYER), 'Write Privilege:' (value: PREFS_WRITE_BUSLAYER), and 'Description:'. At the bottom of the form are 'Save', 'Remove', and 'Cancel' buttons. A faint background image of a smartphone is visible on the right side of the form.

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Nodes and System Preferences

Preference nodes store system preferences and configuration data. Each system preference contains a key-value pair associated with a preference path. You can add a preference node, which requires the application name and full node path. If the application does not exist, you must add the application before adding a preference node. You can remove preference nodes, but you cannot edit them.

Additionally, you can export the node information to XML, which contains the application name, path of the node, and preference keys and values.

SYBASE 365
MOBILE SERVICES

Operations Dashboard

Logged-in as: Operations Manager (104) | Logout | Languages

HOME | SERVERS | TRACKERS

Home
Preferences
Jobs
Change Password

Preferences » Node

Selected Node

Application: businesslayer
Node Full Path: /com/sybase365/mobiliser/util/messaging/channelmanager/engine/impl/ChannelInstantiator/emailchannel1

Refresh Remove Export Cancel

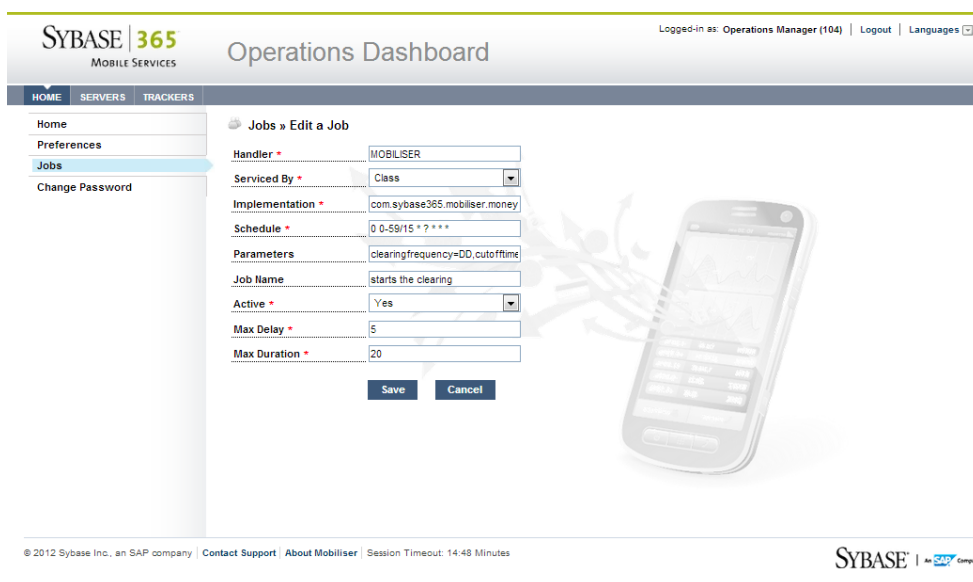
Preferences

Showing: 1 - 9 (9 Total)

Key	Value	Actions
_active	false	Edit Remove
_channelType	email	Edit Remove
channelId	defaultQ	Edit Remove
mail.host	localhost	Edit Remove
mail.port	25	Edit Remove
mail.protocol	smtp	Edit Remove
mail.sign	false	Edit Remove
sign.hashAlgorithm	-1	Edit Remove
sign.keyId	-1	Edit Remove

Jobs

The Jobs option lets you schedule background jobs to run at certain times using cron expressions. For example, you can schedule a job to run at midnight to transfer commissions to the individual partners. You can also schedule a job to run every five minutes to generate new invoices. The cron job execution task retrieves jobs regularly from a database table according to the job handler name. The task makes sure that each job does not run in parallel multiple times, cancels jobs that are not responding, and synchronizes job execution across Java virtual machines (JVMs).



SYBASE 365 MOBILE SERVICES | Operations Dashboard

Logged-in as: Operations Manager (104) | Logout | Languages

HOME | SERVERS | TRACKERS

Home
Preferences
Jobs
Change Password

Jobs » Edit a Job

Handler *

Serviced By *

Implementation *

Schedule *

Parameters

Job Name

Active *

Max Delay *

Max Duration *

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Field	Description
Handler	Defines which cron job task handles the job. The handler corresponds to a defined value in the database. The default handler is MOBILISER. You can enter multiple handlers separated by commas (MOBILISER, MOBILISER1, and so on).
Serviced By	Indicates the filter for the job implementation: Class or Bean.
Implementation	Defines the service filter to find the proper implementation in the service registry. <ul style="list-style-type: none"> If the service filter is set to Class, then use the full class name. If the service filter is set to Bean, then use the job bean name.

Field	Description
Schedule	Defines the job schedule in cron expression format. For example, 0 0/5 * ? * * * is a cron expression that is triggered every 5 minutes. The default expression is 0 0/1 * * ? * , which is triggered to run every minute.
Parameters	Defines the parameters that the job handler requires for job processing. Parameters can be any string that depends on the expected result of the job.
Job Name	Defines the description of the job.
Active	Determines if the job is active or inactive.
Max Delay	Gives the maximum number of minutes a job is executed after the scheduled time. If max delay time is exceeded, the job is not started.
Max Duration	Gives the maximum duration in minutes. After this time the job is handled as failed. If max duration time is exceeded, such as running longer than indicated, the job is canceled and marked as failed.

See also

- *Cron Expression Reference* on page 25

Servers

The Servers option displays a list of available Money Mobiliser servers. You can select a server that is online to view information, requests, data, channels, events, or tasks.

Server List

The Server List displays the online and offline servers in the Money Mobiliser environment. You can select a server that is online to view its information or ping its host. When you select a server, its hostname and port display in the left pane. If a server is offline, the visual indicator in the status column shows an orange circle with an exclamation mark. You cannot select or ping a server that is offline.

You can add other servers that are in the Money Mobiliser environment to the list. To add a server, click **Add a Server** and provide the host name or IP address, and the port number. In addition to adding servers to the list, you can remove servers.

SYBASE 365 MOBILE SERVICES | Operations Dashboard | Logged-in as: Operations Manager (104) | Logout | Languages

HOME | **SERVICES** | TRACKERS

Server
 Hostname: localhost
 Port: 8080

Server List
 Information
 Requests
 Data
 Channels
 Events
 Tasks

Mobiliser Server List | Add a Server

Showing: 1 - 2 (2 Total)

Selected?	Address	Status	Actions
<input checked="" type="checkbox"/>	Hostname: localhost Port: 8080	Online (Green Arrow)	Ping Select Remove
<input type="checkbox"/>	Hostname: test Port: 8081	Offline (Orange Exclamation Mark)	Ping Select Remove

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Information

The Information option summarizes the basic system environment information for the selected server, such as number of processors and operating system. You can also view the

Servers

total and free physical memory, committed virtual memory, and swap space, as well as the time server has been available and class paths.

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MOBILE SERVICES

Operations Dashboard

Logged-in as: Operations Manager (104) | Logout | Languages

HOME | SERVERS | TRACKERS

Server

Hostname: localhost

Port: 8080

Server List

Information

Requests

Data

Channels

Events

Tasks

Information

System Environment

Operating System: Linux 2.6.32-279.14.1.el6.x86_64

Architecture: amd64

Number of Processors: 2

Committed Virt. Memory: 3,091 MB

Total Physical Memory: 8,061 MB

Free Physical Memory: 270 MB

Total Swap Space: 1,048 MB

Free Swap Space: 1,048 MB

VM Environment

Process: 5607@demo02.resdev.lab

Name/Version: Java HotSpot(TM) 64-Bit Server VM 23.5-b02

Vendor: Oracle Corporation

Up Time: 64d 20:45:39.726

Start Time: 12/5/12 10:12:52 PM

JIT Compiler: HotSpot 64-Bit Tiered Compilers

Paths

Class Path: /opt/sybase/mobiliser/bundles/com.sybase365.mobiliser.vanilla.scripts-5.1.0.SP01.jar

Boot Class Path: /usr/java/jdk1.7.0_09/jre/lib/resources.jar

Library Path: /usr/java/packages/lib/amd64

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Requests

The Requests option displays all requests made to the Money Mobiliser server, for example, transaction requests. You can drill down into the statistics of each request. The statistics show

the total number of requests made, the success or failure count, and the average response time.

The screenshot displays the Sybase 365 Operations Dashboard. The top navigation bar includes the Sybase 365 logo, the title "Operations Dashboard", and user information: "Logged-in as: Operations Manager (104) | Logout | Languages". Below the navigation bar, there are tabs for "HOME", "SERVERS", and "TRACKERS". The left sidebar contains a "Server" section with details for "localhost" on port "8080", and a "Requests" section which is currently selected. The main content area, titled "Requests", shows a tree view of "Request Type" categories. The "transaction" category is expanded, listing various transaction types such as "GetTransactionDetailsRequest", "ContinuePayInvoice", "PreAuthorisationContinue", "DemandForPayment", "FindTransactionsRequest", "StartVoucher", "ConfirmVoucher", "PreAuthorisation", "ClearCommissionsRequest", "CheckPayInvoice", and "PrePickupMoney". Other categories like "invoice", "audit", "security", "customer", "wallet", "v5_0", "system", "prefs", "report", "messaging", "coupon", "management", and "ping" are also visible but collapsed. The footer contains copyright information for Sybase Inc. and SAP, along with a "WICKET AJAX DEBUG" button.

Data

The Data option displays the data access statistics and information for the server, such as the number of sessions opened or closed, transactions from the database, maximum and minimum request duration, and query execution rate.

The screenshot displays the Sybase 365 Mobile Services Operations Dashboard. The top navigation bar includes 'HOME', 'SERVERS', and 'TRACKERS'. The left sidebar lists 'Server', 'Server List', 'Information', 'Requests', 'Data' (highlighted), 'Channels', 'Events', and 'Tasks'. The main content area is titled 'Data' and contains three sections: 'General Settings', 'Counts', and 'Timing'. The 'General Settings' section shows 'Statistics Enabled' and 'Hibernate STAT Supported' as 'true', and 'Region Caches Enabled' as 'true'. The 'Counts' section displays various counts, all currently at 0. The 'Timing' section shows 'Max Request Duration (ms)' and 'Min Request Duration (ms)' as 0, and 'Query Execution Rate' as 0.0. A background image of a smartphone is visible on the right side of the dashboard.

General Settings	
Statistics Enabled	true
Hibernate STAT Supported	true
Region Caches Enabled	true

Counts	
PrepareStatement Count	0
Query Execution Count	0
Close Statement Count	0
Session Open Count	0
Session Close Count	0
Transaction Count	0
Successful TXII Count	0
Flush Count	0
Optimistic Failure Count	0

Timing	
Max Request Duration (ms)	0
Min Request Duration (ms)	0
Query Execution Rate	0.0

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Channels

The Channels option displays the number of messages received, sent, and failed to send. The list shows the last 100 messages that the Money Mobiliser messaging services generated. You can select a message to view the details, such as date and time stamp. You can also refresh the list to show the most recently sent or received messages.

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Operations Dashboard

Logged-in as: Operations Manager (104) | Logout | Languages

HOME SERVERS TRACKERS

Server

Hostname: localhost
Port: 8080

Server List

Information

Requests

Data

Channels

Events

Tasks

Channels

Available Channels [defaultQ]

Messages Received 0

Messages Sent 35

Messages Failed To Send 143

Messages

Reload

Messages

SMS Message Recipient: +3035551234 Sender: 625477 XXX

SMS Message Recipient: +3075556936 Sender: 625477 XXX

SMS Message Recipient: +3038196936 Sender: 625477 XXX

SMS Message Recipient: +3035551234 Sender: 625477 XXX

SMS Message Recipient: +3075556936 Sender: 625477 XXX

SMS Message Recipient: +3038196936 Sender: 625477 XXX

SMS Message Recipient: +3035551234 Sender: 625477 XXX

SMS Message Recipient: +3075556936 Sender: 625477 XXX

SMS Message Recipient: +3038196898 Sender: 625477 XXX

SMS Message Recipient: +3038195264 Sender: 625477 XXX

SMS Message Recipient: +3038195264 Sender: 625477 XXX

SMS Message Recipient: +3035551234 Sender: 625477 XXX

SMS Message Recipient: +3075556936 Sender: 625477 XXX

SMS Message Recipient: +3035551234 Sender: 625477 XXX

SMS Message Recipient: +3035551234 Sender: 625477 Your password has been changed.

SMS Message Recipient: +3035551234 Sender: 625477 XXX

SMS Message Recipient: +3075556936 Sender: 625477 XXX

SMS Message Recipient: +3035551234 Sender: 625477 XXX

Events

The Events option displays statistics generated by the Money Mobiliser event system. The event summary displays the total number of events that the event handlers have generated and processed. An event handler is a procedure that is called when a corresponding event occurs. For an event to be processed by a handler, there has to be an event handler registered for the event name and an available thread from the process pool as determined by the event handler. A single event handler instance is associated with a single event name only.

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Operations Dashboard

Logged-in as: Operations Manager (104) | Logout | Languages

HOME | **SERVICES** | TRACKERS

Server

Hostname: localhost
Port: 8080

Server List
Information
Requests
Data
Channels

Events
Tasks

Events

Summary

No. of Regular Events6932

No. of Regenerated Events0

No. of Delayed Events0

No. of Transient Events265892

No. of Scheduled Events0

Event Queues - Physical

Queue Name	Current Size	Maximum Size
DelayedQ	0	0
CatchupQ	0	0
ProcessQ	0	0

Event Queues - Virtual

Queue Name	Current Size	Maximum Size
InvoiceStatusAdviceTask	0	1
UnlockLockedTransactions	0	1
CancelAuthWaitingTransactionsTask	0	1
FileExportTask	0	1
CancelExpiredVouchersTask	0	1
CancelExpiredTransactionTask	0	1
InvoiceUpdateCreateTask	0	1
CronjobTask	0	1
CancelInitialTransactionsTask	0	1

Scheduled Events

No scheduled events

Event Handlers

Handler Name	Status	Event
InsufficientFundsNotificationHandler	LISTENING	InsufficientFundsAlert
TransactionSummaryNotificationHandler	LISTENING	TransactionSummaryAlert
PanicPayNotificationHandler	LISTENING	PanicPayAlert
BankInquiryResponseNotificationHandler	LISTENING	BankInquiryResponseAlert
InvalidAccountAccessNotificationHandler	LISTENING	InvalidAccountAccessAlert
RegistrationTransactionEventHandler	LISTENING	RegistrationCompleteEvent
CustomerLockoutNotificationHandler	LISTENING	CustomerLockoutAlert
AMS_FILE_EXPORT	LISTENING	ClearingEvent
AccountBalanceSummaryNotificationHandler	LISTENING	AccountBalanceSummaryAlert
InvoiceAutoPayEventHandler	LISTENING	InvoiceCreatedEvent
AMS_Transfer	LISTENING	TransactionEvent
UnreadBankMessageNotificationHandler	LISTENING	UnreadBankMessageAlert
TransactionNotificationEventHandler	LISTENING	TransactionEvent
CustomerBlacklistChangeEventHandler	LISTENING	CustomerBlacklistChangeEvent
AccountBalanceThresholdNotificationHandler	LISTENING	AccountBalanceThresholdAlert
BalanceAlertEventHandler	LISTENING	TransactionEvent
PasswordChangedNotificationHandler	LISTENING	PasswordChangedAlert
CredentialChangeEventHandler	LISTENING	CredentialChangeEvent
WrongCredentialEventHandler	LISTENING	WrongCredentialEvent

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See also

- *Event Queues* on page 17
- *Scheduled Events* on page 17
- *Event Handlers* on page 18

Event Queues

Event queues display a list of physical and virtual queues, and an instantaneous count of events for the queues.

Table 1. Event Queues

Queue	Description
Physical	Displays the number of events that are present in the physical queue at that instance in time. If the queue is empty, no events are pending for processing.
Virtual	Indicates how many events are in the physical queues for each event name at that instance in time. One virtual queue per event name. If no virtual queues are shown, then no events have been created.

See also

- *Events* on page 15

Scheduled Events

Scheduled Events display the internal scheduler system view of all events that are scheduled for triggering. An empty list indicates no known scheduled events.

Table 2. Scheduled Events

Field Label	Description
Scheduled Event Id	The internal identification of the scheduled event.
Time Zone	An optional time zone in which the cron expression is run.
Cron Expression	An expression conforming to UNIX cron standards for specifying repeats.
End Time	The time beyond which no more triggers will fire, or empty if never set.
Start Time	The time the first trigger fired.
Next Fire Time	The expected time of the next trigger fire.
Last Fire Time	The last time the trigger fired.

Field Label	Description
Trigger	<p>A trigger is a set of criteria that, when met, starts the execution of an event.</p> <p>Simple – One-off: Triggers the event once.</p> <p>Cron – Repeating: Triggers the event at repeated intervals.</p>

See also

- *Events* on page 15

Event Handlers

Event handlers display a list of existing handlers registered with the event system.

Table 3. Event Handlers

Field Label	Description
Status	<p>Current status of the event.</p> <p>Listening: Active and waiting to be notified when an event occurs.</p> <p>Catchup: Regenerated events are still processing.</p>
Event Name	Event name against which the handler is registered.
Current Active Thread	Threads running at this point in time.
Current Idle Thread	Threads allocated to this handler's pool, but not active at this time.
Max Active Thread	Maximum size of event handler thread pool.
Max Idle Thread	Maximum number of idle but not active threads in the pool.
Total Number of Runs	Number of times the task handler was invoked – might be different from Total Events Processed because a handler run does not cause an event to be processed if the handler cannot get a processing status lock on the event or if the event is expired.
Last Run At	Date and time of last run.
Total Events Processed	Number of times the handler process method was called.
Average Process Time (ms)	Average amount of time spent in the handler's process method.
Total Events Success	Number of events that returned true from its handler process.
Total Events Fail	Number of events that returned false or through an exception from the handler process.

Field Label	Description
Last Fail At	Date and time of last indicated failed processing event.
Events Marked Expired	Number of events whose expire time has been reached before processing.
Events Marked Catch Up	Number of events still processing regenerated events.

See also

- *Events* on page 15

Tasks

The Tasks option displays statistics generated by the Money Mobiliser event system for tasks as well as the task handlers, which are called by the tasks. Tasks are internal date and time actions scheduled for execution at known repeated intervals. An empty list indicates no known scheduled events. A task is not directly related to an event because a task is not stored in the event system and does not require the regeneration of historical events for a task handler. However, the event system initiates and controls the processing of task actions.

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MOBILE SERVICES

Operations Dashboard

Logged-in as: Operations Manager (104) | Logout | Languages

HOME | SERVERS | TRACKERS

Server

Hostname: localhost

Port: 8080

Server List

Information

Requests

Data

Channels

Events

Tasks

Tasks

Tasks

Tasks Name	Cron Expression
UnlockLockedTransactions	0 0/5 * ? * *
InvoiceStatusAdviceTask	0 0/5 * ? * *
CancelExpiredTransactionTask	0 0/5 * ? * *
FileExportTask	0 0/5 * ? * *
CancelInitialTransactionsTask	0 0/5 * ? * *
CancelExpiredVouchersTask	0 0/5 * ? * *
InvoiceUpdateCreateTask	0 0/5 * ? * *
CronjobTask	0 0/1 * * * ?
CancelAuthWaitingTransactionsTask	0 0/5 * ? * *

Tasks Handlers

Handler Name	Status	Event
...jobs.tasks.invoice.update.InvoiceUpdateCreateTask	LISTENING	InvoiceUpdateCreateTask
...liser.money.jobs.tasks.cleanup.LockedTransactions	LISTENING	UnlockLockedTransactions
...jobs.tasks.invoice.status.InvoiceStatusAdviceTask	LISTENING	InvoiceStatusAdviceTask
...money.jobs.task.cronjob.handler.CronjobTaskHandler	LISTENING	CronjobTask
...liser.money.jobs.tasks.cleanup.InitialTransactions	LISTENING	CancelInitialTransactionsTask
...tasks.cancelexpired.CancelExpiredTransactionsTask	LISTENING	CancelExpiredTransactionTask
...365.mobiliser.money.ams.export.task.FileExportTask	LISTENING	FileExportTask
...bs.tasks.expired.voucher.CancelExpiredVouchersTask	LISTENING	CancelExpiredVouchersTask
...r.money.jobs.tasks.cleanup.AuthWaitingTransactions	LISTENING	CancelAuthWaitingTransactionsTask

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See also

- *Task Details* on page 20
- *Task Handlers* on page 21

Task Details

Task Details display task information and statistics such as task start time, next and last fire time, and trigger.

Table 4. Task Details

Field Label	Description
Scheduled Event Id	The internal identification of the scheduled event.
Time Zone	An optional time zone in which the cron expression should be run.

Field Label	Description
Cron Expression	An expression conforming to UNIX cron standards for specifying repeats.
End Time	The time beyond which no more triggers will fire, or empty if never set.
Start Time	The time the first trigger fired.
Next Fire Time	The expected time of the next trigger fire.
Last Fire Time	The last time the trigger fired.
Trigger	<p>A trigger is a set of criteria that, when met, starts the execution of an event.</p> <p>Simple – One-off: Triggers the event once.</p> <p>Cron – Repeating: Triggers the event at repeated intervals.</p>

See also

- *Tasks* on page 19

Task Handlers

Task Handlers display a list of existing task handlers, which are called by the tasks. A task handler coordinates the activities of a task.

Table 5. Task Handlers

Field Label	Description
Status	<p>Current status of the event.</p> <p>Listening: Active and waiting to be notified when an event occurs.</p> <p>Catchup: Regenerated events are still processing.</p>
Event Name	Event name against which the handler is registered.
Current Active Thread	Threads running at this point in time.
Current Idle Thread	Threads allocated to this handlers pool, but not active at this time.
Max Active Thread	Maximum size of event handler thread pool.
Max Idle Thread	Maximum number of idle but not active threads in the pool.
Total Number of Runs	Number of times the task handler was invoked – maybe different from Total Events Processed because a handler run does not cause an event to be processed if the handler cannot get a processing status lock on the event or if the event is expired.
Last Run At	Date and time of last run.

Field Label	Description
Total Events Processed	Number of times the handler process method was called.
Average Process Time (ms)	Average amount of time spent in the handler's process method.
Total Events Success	Number of events that returned true from its handler process.
Total Events Fail	Number of events that returned false or through an exception from the handler process.
Last Fail At	Date and time of last indicated failed processing event.
Events Marked Expired	Number of events whose expire time has been reached before processing.
Events Marked Catch Up	Number of events still processing regenerated events.

See also

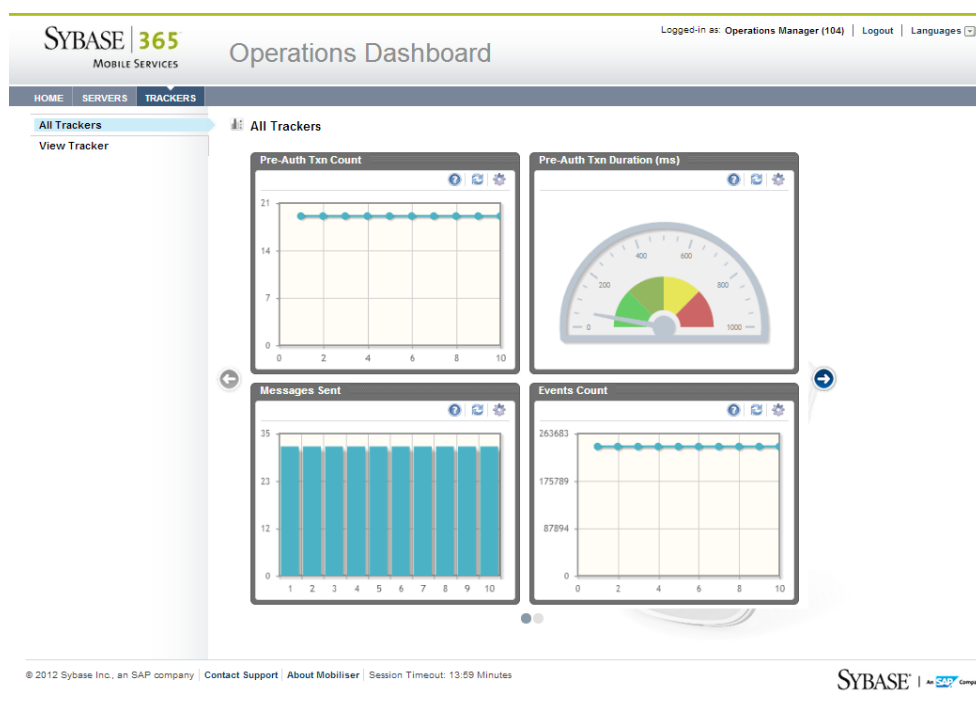
- *Tasks* on page 19

Trackers

The Trackers option lets you visually monitor certain statistics of a Money Mobiliser system through a series of different chart types such line, bar, and gauge. For example, memory usage is presented as a bar chart, and pre-authorization of a transaction request is presented as a gauge chart.

You can monitor and track information such as statistics or status changes from a particular server information point. You can view trackers either on a summary page with easy navigation on the All Trackers page or individually on the View Tracker page.

Note: Trackers can be added via XML configuration by the dashboard developer.



Cron Expression Reference

A cron expression is a string comprised of six or seven fields separated by white space. Fields can contain any of the allowed values, along with various combinations of the allowed special characters for that field. Cron expressions can be as simple as `* * * * ? *` or as complex as `0/5 14,18,3-39,52 * ? JAN,MAR,SEP MON-FRI 2002-2010`.

Fields can contain any of the allowed values alone with various combinations of the allowed special characters for that field.

Table 6. Cron Expression Format

Field Name	Allowed Value	Allowed Special Characters
Seconds	0-59	, - * /
Minutes	0-59	, - * /
Hours	0-23	, - * /
Day-of-Month	1-31	, - * ? / L W
Month	1-12 or JAN-DEC	, - * /
Day-of-Week	1-7 or SUN-SAT	, - * ? / L #
Year (Optional)	empty, 1970-2199	, - * /

Table 7. Special Characters

Character	Description
*	Asterisks indicate that the cron expression matches for all values of the field. For example, "*" in the minute field means every minute.
?	Question marks are used to specify 'no specific value' and is allowed for the day-of-month and day-of-week fields. It is used instead of the asterisk (*) for leaving either day-of-month or day-of-week blank.
-	Hyphens are used to define ranges. For example, "10-12" in the hour field means the hours of 10, 11, and 12.
,	Commas are used to separate items of a list. For example, "MON,WED,FRI" in the day-of-week field means the days Monday, Wednesday, and Friday.
/	Forward slash are used to indicate increments. For example, "0/15" in the seconds field means the seconds 0, 15, 30, and 45. Additionally, "1/3" in the day-of-month field means every 3 days starting on the first day of the month.

Character	Description
L	Short-hand for "last" and is allowed for the day-of-month and day-of-week fields. The "L" character has a different meaning in each of the two fields. For example, "L" in the day-of-month field means the last day of the month. If used in the day-of-week field, it means 7 or SAT. However, if used in the day-of-week field after another value, it means the last xxx day of the month. For example, "6L" in the day-of-week field means the last Friday of the month.
W	Short-hand for "weekday" and is allowed for the day-of-month field. The "W" character is used to specify the weekday nearest the given day. For example, "15W" in the day-of-month field means the nearest weekday to the 15th of the month. Therefore, if the 15th is a Saturday, the job runs on Friday the 14th. The "L" and "W" characters can be combined in the day-of-month field. For example, "LW" means the last weekday of the month.
#	Hash marks specify constructs. For example, "6#3" in the day-of-week field means the third Friday of the month.

Table 8. Cron Expression Examples

Expression	Description
0 0 12 * * ?	Triggered to run at 12:00 p.m. (noon) every day
0 15 10 ? * *	Triggered to run at 10:15 a.m. every day
0 15 10 * * ?	Triggered to run at 10:15 a.m. every day
0 15 10 * * ? *	Triggered to run at 10:15 a.m. every day
0 15 10 * * ? 2005	Triggered to run at 10:15 a.m. every day during the year 2005
0 * 14 * * ?	Triggered to run every minute starting at 2:00 p.m. and ending at 2:59 p.m., every day
0 0/5 14 * * ?	Triggered to run every 5 minutes starting at 2:00 p.m. and ending at 2:55 p.m., every day
0 0/5 14,18 * * ?	Triggered to run every 5 minutes starting at 2:00 p.m. and ending at 2:55 p.m., AND fire every 5 minutes starting at 6:00 p.m. and ending at 6:55 p.m., every day
0 0-5 14 * * ?	Triggered to run every minute starting at 2:00 p.m. and ending at 2:05 p.m., every day
0 10,44 14 ? 3 WED	Triggered to run at 2:10 p.m. and at 2:44 p.m. every Wednesday in the month of March

Expression	Description
0 15 10 ? * MON-FRI	Triggered to run at 10:15 a.m. every Monday, Tuesday, Wednesday, Thursday and Friday
0 15 10 15 * ?	Triggered to run at 10:15 a.m. on the 15th day of every month
0 15 10 L * ?	Triggered to run at 10:15 a.m. on the last day of every month
0 15 10 L-2 * ?	Triggered to run at 10:15 a.m. on the 2nd-to-last last day of every month
0 15 10 ? * 6L	Triggered to run at 10:15 a.m. on the last Friday of every month
0 15 10 ? * 6L 2002-2005	Triggered to run at 10:15 a.m. on every last Friday of every month during the years 2002, 2003, 2004 and 2005
0 15 10 ? * 6#3	Triggered to run at 10:15 a.m. on the third Friday of every month
0 0 12 1/5 * ?	Triggered to run at 12:00 p.m. (noon) every 5 days every month, starting on the first day of the month
0 11 11 11 11 ?	Triggered to run every November 11 at 11:11 a.m.

See also

- *Jobs* on page 9

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