Usage Guide
OAM REST Phase 1.5 (OA68795)
V3R1 and above

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Table of Contents

Introduction 3

MVS Operator Commands 3

- Scheduling an SVC Dump for the OAMREST Address Space 3
- Starting and Stopping Temporary Diagnostic Messages for OAMREST 3

SMF 85 Records 6

- New SMF Record Subtypes 6
  - Subtype 200: Security Activity 6
  - Subtypes 201-206: Request Activity 8
- Additional Information 10

Version Comparison 11

Messages 12

- Overview 12
- Existing Messages 12
  - CBR1620I 12
  - CBR1990I 12
  - CBR1991I 13
  - CBR1992I 13
  - CBR1993I 14
  - CBR8813I 14
- New Messages 14
  - CBR8874A 14

Introduction

REST 1.5 support builds on the existing REST support for OAM by adding the following:

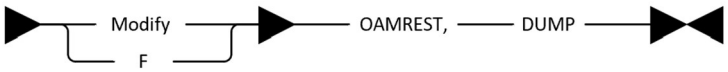
- New SMF type 85 subtypes 200-206 specific to REST activity
- MVS commands for taking dumps and enabling CDA logging for the OAMREST address space
- Version comparison between the bridge program and web application to ensure the two remain in sync

MVS Operator Commands

Scheduling an SVC Dump for the OAMREST Address Space

As with the OAM address space, issues found associated with the OAMREST address space may require a DUMP of the address space to be taken. Issue the new OAMREST DUMP operator command through the console.

The following can be issued to schedule a dump for the OAMREST address space:



OAMREST

The task-id for the associated OAMREST address space.

DUMP

start SVC dump of OAMREST address space and the corresponding OAM address space identified through a shared DB2SSID.

OAMREST issues messages for any errors found in the DUMP command at SVC scheduling time and at SVC DUMP data capture completion.

Starting and Stopping Temporary Diagnostic Messages for OAMREST

OAMREST processing uses CDA (Cloud Data Access) for client credential authentication. CDA provides the option for logging with a level of either DEBUG, ERROR, or NONE. This logging starts disabled unless the CDA configuration file (found in /.../gdk/config.json) includes setting a log level. Turning on CDA logging allows additional information regarding CDA processing to be printed to the OAMREST job log. This support adds a new operator

command that allows CDA logging to be dynamically enabled for a specified number of transactions.

The following MVS MODIFY command syntax will start or stop the temporary CDA diagnostic messages:

OAMREST

The task-id for the associated OAMREST address space.

DIAGMSGS

Keyword for diagnostic messages

CDALOG

CDA logging for the OAMREST job log

LIM=nnnn

Specifies the number of CDA invocations where logging is captured. Valid values for *nnnn* are 0 through 9999. If a number greater than 4 digits is specified, all input past the 4th digit is ignored.

The default value is 10. OAMREST automatically stops the display of CDA logging messages when the LIM is reached.

CDADEBUG

Sets the CDA log level to ‘DEBUG’. This is the default log level. It causes the CDA logging to print error and debug messages to the OAMREST job log.

CDAERROR

Sets the CDA log level to ‘ERROR’. This causes the CDA logging to only print error messages to the OAMREST job log.

When diagnostic messages are started successfully for CDA logging to OAMREST, the following messages are issued:

CBR1994I: CDA logging level set to {DEBUG | ERROR}.
CBR1990I: *oamrest-taskid* diagnostic messages started for CDALOG Limit= *limit*.

When a subsequent CDA logging operator command is used to successfully reset CDA logging to OAMREST, the following messages are issued:

CBR1994I: CDA logging level set to {DEBUG | ERROR}.
CBR1992I: *oamrest-taskid* diagnostic messages reset for CDALOG Limit = *limit*.

When diagnostic messages are stopped successfully for CDA logging to OAMREST, the following message is issued:

CBR1991I: OAMREST diagnostic messages will no longer be issued for CDALOG

Message CBR1991I is also issued automatically by OAMREST to the job log when the current limit of transactions is reached.

SMF 85 Records

New SMF Record Subtypes

The OAM Header (48 bytes) and OAM Product section (112 bytes) will be the same for the new subtypes (200-206) as it is for other type 85 records.

If enabled, existing SMF 85 subtypes (1-7) will continue to be generated with the REST support. Subtypes (8-10) for a multi-part store are not currently supported with REST and will not be generated.

Subtype 200: Security Activity

Record Length: 420 bytes (Including OAM Header and OAM Product section)

Field Layout:

OAM REST Security activity subtype 200 data section format				
Offsets	**Name**	**Length**	**Format**	**Description**
0 0	ST200REQID	16	EBCDIC	Request ID associated with the REST request.
16 10	ST200COLN	44	EBCDIC	Collection (bucket) name.
60 3C	ST200OBJN	44	EBCDIC	Object (key) name.
104 68	ST200USRID	8	EBCDIC	User ID associated with access key
112 70	ST200FUNC	1	Binary	Requested Function • 1 - Put (Store) • 2 – Get (Retrieve) • 3 – Get (Range/Partial Retrieve Request) • 4 – HeadObject (Query) • 5 – GetObjectTagging (Query) • 6 – PutObjectTagging (Change) • 7 - Delete • 8 – 255 Reserved
113 71	*	3	Binary	Reserved
116 74	ST200FLGS	4	Binary	Processing Flags – Bit meaning when set.

				• 0 – when on, the access key was not successfully retrieved. • 1 – when on, the user associated with the access key was not found in RACF (or an equivalent security product). • 2 – when on, the user associated with the access key was found not to be authorized to the request through RACF (or an equivalent security product). • Other flag bits are reserved.
120 78	ST200BRC	4	Binary	OAM Bridge (OAMREST) return code
124 7C	ST200CDAGN	64	EBCDIC	CDA Group (Provider) Name
188 BC	ST200SACCK	64	EBCDIC	S3 Access Key
252 FC	ST200CTME	4	Binary	Cloud Data Access (CDA) time. The amount of time in milliseconds that this request has spent in Cloud Data Access obtaining the credentials associated with the request.
256 100	ST200RTME	4	Binary	RACF (or equivalent security product) time. The amount of time in milliseconds this request has spent in RACF verifying if the requestor has access to the requested function.

Subtypes 201-206: Request Activity

Subtype	Operation	Use Case
201	PUT request	Monitor object store operations
202	GET request	Monitor object retrieve operations
203	HEAD request	Analyze object metadata
204	GetObjectTagging	Analyze object metadata
205	PutObjectTagging	Monitor object meta data changes
206	DELETE request	Monitor delete operations

Record Length: 324 bytes (Including OAM Header and OAM Product section)

Field Layout:

S3 REST activity subtypes 201-206 data section format				
Offsets	**Name**	**Length**	**Format**	**Description**
0 0	ST201REQID	16	EBCDIC	Request ID associated with the REST request.
16 10	ST201COLN	44	EBCDIC	Collection (bucket) name.
60 3C	ST201OBJN	44	EBCDIC	Object (key) name.
104 68	ST201USRID	8	EBCDIC	User ID associated with access key (used to sign the S3 request).
112 70	ST201FUNC	1	Binary	Requested Function • 1 - Put (Store) • 2 – Get (Retrieve) • 3 – Get (Range/Partial Retrieve Request) • 4 – HeadObject (Query) • 5 – GetObjectTagging (Query) • 6 – PutObjectTagging (Change) • 7 - Delete

				8 – 255 Reserved
113 71	*	3	Binary	Reserved
116 74	ST201FLGS	4	Binary	Processing Flags – Bit meaning when set. • 0 – when on, the REST request encountered a failure and could not be processed. When this bit flag is on, bit flags 1, 2, or 3 will also be on indicating where in the process the failure occurred. • 1 – when on, the OAM Bridge Program invoked the OSREQ (OAM) macro interface, and a failure was returned. Refer to the OSREQ return and reason codes for the cause of the failure. • 2 – when on, the OAM Bridge Program encountered a failure, and the request could not be sent to OSREQ (OAM) to process. Refer to the OAM Liberty Web Application log for the entry associated with the request ID (ST201USRID) for the cause of the failure. • 3 – when on, the OAM Web Application encountered a failure, and the request could not be sent to OSREQ (OAM) to process. Refer to the "OAM Liberty Web Application log for the entry associated with the request ID (ST201USRID) for the cause of the failure. Other bit flags are reserved.
120 78	ST201BRC	4	Binary	OAM Bridge (OAMREST) return code
124 7C	*	4	Binary	Reserved
128 80	ST201OLEN	8	Binary	Object Length. Valid for subtypes 201 and 202 201 – length of the object stored (put) 202 – number of bytes retrieved (get) 203 – unused, contains binary zeroes 204 – unused, contains binary zeroes 205 – unused, contains binary zeroes 206 – unused, contains binary zeroes

136 88	ST201OOFF	8	Binary	Offset for a partial object (range) request. Valid for subtype 202.
144 90	ST201ORC	4	Binary	OSREQ return code associated with the REST request.
148 94	ST201ORS	4	Binary	OSREQ reason code associated with the REST request.
152 98	ST201ORC2	4	Binary	OSREQ return code 2 associated with the REST request.
156 9C	ST201DTME	4	Binary	DB2 open time. The amount of time between DB2 Open and acquiring a thread
160 A0	ST201OTME	4	Binary	OSREQ time. The amount of time in milliseconds spent in OSREQ processing the requested function. This includes the amount of time spent in the OAM address space (as appropriate). To determine the amount of time spent prior to the invocation of OSREQ, this time can be subtracted from the elapsed time in the OAM product section of this record.

Additional Information

- Each REST API request generates two SMF records in addition to other existing OAM SMF records related to the request:

  1. Subtype 200 (security check)
  2. Subtype 201-206 (actual operation)

     Note: The Request ID fields in the subtype 200 and subtype 201-206 (ST200REQID and ST201REQID respectively) can be used to correlate a security record and activity record for the same request.

- For requests made through the OAM REST API, SMF type 85 subtypes 200-206 records will record an “OAMREST Bridge Return Code” (fields ST200BRC or ST201BRC). This field is for internal use to diagnose errors on the bridge program side of OAMREST.

  Bridge Return Codes

Value	Description
0 (X’00’)	No bridge program error
1 (X’01’)	CBRWOLA task terminated before request was processed
2 (X’02’)	GETMAIN error
3 (X’03’)	OAMREST terminating during request processing
4 (X’04’)	Invalid offset or length
5 (X’05’)	Invalid function code

6 (X'06')	User ID not found during CDA call
7 (X'07')	Secret Key not found during CDA call
8 (X'08')	Rec data length too long
9 (X'09')	Abort requested
10 (X'0A')	Version number is invalid
11 (X'0B')	CBRWOLA abend
12 (X'0C')	CBRWOREC abend
13 (X'0D')	CBRWORPT abend
14 (X'0E')	Invalid DB2SSID
15 (X'0F')	DB2 open/close error
16 (X'10')	Load CEEPIPI failed
17 (X'11')	Init CEEPIPI failed
18 (X'12')	CDA session error
19 (X'13')	CDA callsub error
20 (X'14')	DB2 commit error
21 (X'15')	Access key retrieval error
22 (X'16')	User ID not in RACF
23 (X'17')	User ID not authorized for request
51 (X'33')	BBOA1GET error
52 (X'34')	BBOA1SRP error
53 (X'35')	BBOA1RCS error
54 (X'36')	BBOA1CNR error
55 (X'37')	BBOA1RCA error

Version Comparison

OAM's REST support has a web application part and a bridge program part that need to be kept in sync. To ensure they are in sync, this support has added additional checking when a REST request is received. If it is found that the two are not the same version a new message CBR8874A (documented below) is issued and highlighted on the console and the request, as well as subsequent requests, will fail. In this case, the system programmer should be contacted to verify the most recent versions of the OAM web application and OAM bridge program (CBRWOLA) are installed and active.

Messages

Overview

This section covers messages that have been modified and added as a part of this support.

'... ...' indicates the rest of the (documented) message remains unchanged.

Existing Messages

CBR1620I

CBR1620I Requesting SVC dump for {oam-taskid | oamrest-taskid} address space.
Explanation: The operator has entered a command of the form:

```
MODIFY OAM,DUMP
MODIFY OAMREST,DUMP
```

This message indicates that an SVC dump has been requested for the OAM address space oam-taskid or the OAMREST address space oamrest-taskid.

... ...

****

CBR1990I

CBR1990I {oam-taskid | oamrest-taskid} diagnostic messages started for {OSREQFS | OSREQCLD | CLDCDALG | CLDWTKLG | CLDALLLG | CDALOG}.
Explanation: The operator has entered one of the following commands:
For OAM address space:

```
F oam-taskid,START,DIAGMSGS,{OSREQFS|OSREQCLD|CLDWTKLG}
F oam-taskid,START,DIAGMSGS,{OSREQFS|OSREQCLD|CLDWTKLG},LIM=nnnn
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG}
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG},LIM=nnnn
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG},{CDAERROR|CDADEBUG}
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG},LIM=nnnn,
{CDAERROR|CDADEBUG}
```

For OAMREST address space:

```
F oamrest-taskid,START,DIAGMSGS,CDALOG
F oamrest-taskid,START,DIAGMSGS,CDALOG,LIM=nnnn
F oamrest-taskid,START,DIAGMSGS,CDALOG,{CDAERROR|CDADEBUG}
F oamrest-taskid,START,DIAGMSGS,CDALOG,LIM=nnnn,{CDAERROR|CDADEBUG}
```

Diagnostic messages have been started for the specified message type.

... ...
****

CBR1991I

CBR1991I {oam-taskid | oamrest-taskid} diagnostic messages will no longer be issued for {OSREQFS | OSREQCLD | CLDCDALG | CLDWTKLG | CLDALLLG | CDALOG}.
Explanation: The operator has entered one of the following commands:
For OAM address space:

```
F oam-taskid,STOP,DIAGMSGS,
{OSREQFS|OSREQCLD|CLDCDALG|CLDWTKLG|CLDALLLG|CDALOG}
```

For OAMREST address space:

```
F oamrest-taskid,STOP,DIAGMSGS,CDALOG
```

Diagnostic messages have been stopped for the specified message type. This message is also issued automatically when the message limit is reached.
... ...
****

CBR1992I

CBR1992I {oam-taskid | oamrest-taskid} diagnostic messages reset for {OSREQFS | OSREQCLD | CLDCDALG | CLDWTKLG | CLDALLLG | CDALOG}.
Explanation: The operator has entered one of the following commands while diagnostic messages were already active:
For OAM address space:

```
F oam-taskid,START,DIAGMSGS,{OSREQFS|OSREQCLD|CLDWTKLG}
F oam-taskid,START,DIAGMSGS,{OSREQFS|OSREQCLD|CLDWTKLG},LIM=nnnn
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG}
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG},LIM=nnnn
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG},{CDAERROR|CDADEBUG}
F oam-taskid,START,DIAGMSGS,{CLDALLLG|CLDCDALG},LIM=nnnn,
{CDAERROR|CDADEBUG}
```

For OAMREST address space:

```
F oamrest-taskid,START,DIAGMSGS,CDALOG
F oamrest-taskid,START,DIAGMSGS,CDALOG,LIM=nnnn
F oamrest-taskid,START,DIAGMSGS,CDALOG,{CDAERROR|CDADEBUG}
F oamrest-taskid,START,DIAGMSGS,CDALOG,LIM=nnnn,{CDAERROR|CDADEBUG}
```

The diagnostic message parameters have been reset with the new values specified.
... ...

****

CBR1993I

CBR1993I {oam-taskid | oamrest-taskid} diagnostic messages already stopped for {OSREQFS | OSREQCLD | CLDCDALG | CLDWTKLG | CLDALLLG | CDALOG}.
Explanation: The operator has entered one of the following commands:
For OAM address space:

```
F oam-taskid,STOP,DIAGMSGS,
{OSREQFS|OSREQCLD|CLDCDALG|CLDWTKLG|CLDALLLG|CDALOG}
```

For OAMREST address space:

```
F oamrest-taskid,STOP,DIAGMSGS,CDALOG
```

However, diagnostic messages for the specified type were already stopped.
... ...
****

CBR8813I

CBR8813I GETMAIN error for the *oamrest-taskid control block control-block* in module *module-name, failing return code = return-code*.
Explanation: OAMREST control task *oamrest-taskid,* module *module-name, received a GETMAIN failure with return code = return-code* for control block *control-block*.

... ...

New Messages

CBR8874A

CBR8874A Version mismatch detected between *procname* and the configured web application.
Explanation: A version mismatch has been detected between the OAMREST bridge program with the started proc name (*procname*) and the web application while processing a request.
System action: The request will not be processed until the version mismatch is resolved.
Operator response: Notify the system programmer.
System programmer response: Ensure that the most recent versions of the OAMREST bridge program and web application are installed and active.
Source: Object Access Method (OAM)

Routing Code: 2
Descriptor Code: 11