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$BATCH request in SAP GATEWAY

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Hello Guys,

I am from SAP Gateway team,this post will help you get a glimpse of what $batch request really means in Odata .

Answers to expect from this post?

How to get the $batch concept implemented in your existing Odata Service ?

How do I implement CHANGESET process to make the data modification process in sync with each other?

What is new in $BATCH concept as such?

How to make read operations also in sync with one another?

Prerequisite

Basics on how to create a service in SEGW or Odata enabled CDS .

How to register the service and extract data relevant information out of it ?

What will be your take after reading this post?

$Batch-Implementation in technical terms , just go through the post roughly so you can get a deep dive into technical information .

Explained in layman terms , to make it easier in the beginning and technical in later part.

Let's get started.

Batch processing -Enables multiple retrieval operation in a single HTTP request in parallel.
However, the CHANGESET request can be posted along with GET request but it will not be processed parallelly.
Example: If I have two GET request and one CHANGESET set request first GET request will processed parallelly (2) and then change set will be processed.
To activate the batch processing the below configuration needs to be activated in SPRO.
Maximum no -No of batch queries that can be executed in parallel.
It is always recommendable to give the no of parallel process keeping the system performance in time-Because based on the number the existing work process will be allocated for processing the job.

Structure

- SAP Customizing Implementation Guide
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  - **SAP NetWeaver**
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Parallelization of Batch Queries

Activate Parallelization for Batch Queries	☑
Maximum Number of Parallel Queries	3

Parallelization of consecutive queries in a batch request

Message No. /IWBEP/CM_COS250

Diagnosis

A parallelization of consecutive queries in a batch request should be used to optimize the performance of the batch request processing.

Configuration Parameters

The following parameters are valid for the current SAP client:

- "Activate Parallelization for Batch Queries": Mark or unmark this option to enable or disable the parallelization.

- "Maximum Number of Parallel Queries": Specify the maximum number to limit the amount of parallel processing queries to save system resources. This number will be ignored if it is greater than the maximum number of dialog work processes available at parallelization time which is based on system settings (transaction RZ11, profile parameters rdisp/rfc*) . Zero (0) means it only depends on current system resources. Default: 0.

Performance Optimization

In case of serialization the duration of the consecutive queries is the sum of all query processing times. Contrary to this, the total duration in parallel mode is just the maximum duration of these query processing times and a minimal overhead for parallelization.

Example: Say I have 3 Get Request , 2 Post Request, 1 Change request, 1 delete request.

For configuration of 3 as above depicted.

1st step: 3 Get Request

2nd step: 1 post request,

3rd step: 1 post request,

4th Step:1 Change request

5th Step: 1 delete request.

But this number of maximum parallel processing request will be voided if the available work process in system is low for parallel processing.

But this configuration can be disabled for particular service if required with transaction

Transaction: /IWBEP/REG_SERVICE

Maintain Service

🗑 Delete Service

Technical Service Name	~~Z_/____ ___ ___ ____ ___ST~~
Service Version	1

6ð Display	✏ Change	🗋 Create

Display->Configuration
Enable Deactivation from the below check box .

Change Configuration

Service Information

Technical Service Name	~~/___ ___ ___ ____~~
Service Version	1

Service Settings

☐ Deactivate Soft-State based Query Result Cache
☐ Deactivate Parallelization of Batch Requests

Define Cache Request Processing (CRP) Usage

Only the GET requests will be executed in parallel.
Pre-requiste:
It is always must to have HTTP header 'Content-Type' for batch request with value 'multipart/mixed;boundary= '.

The below

HTTP Request Header	
Header Name	Content-Type
Value	multipart/mixed; boundary=batch

Batch request:

The body of a batch request is made up of an ordered series of retrieve operations and/or change sets.

A change set is an atomic unit of work that is made up of an unordered group of one or more of the insert, update or delete operations.

Change sets cannot contain retrieve requests and cannot be nested, that is, a change set cannot contain a change set.

The batch boundary in HTTP header –" Content-Type " specified in the GW client is valid only for retrieve operations.

For Update/Delete/Create request the boundary needs to specified again the "Changeset" exclusively apart from "Content Type" in HTTP header.

Basic Rule before firing a Gateway Batch call:

After GET, PUT, POST, DELETE statement before the input of "Batch" or "Changeset" statement line there should be two-line space as depicted below, if not it will result in error.

GET Statement in line 5, batch close call in line 8.

Example of batch request -Only read entity

Request URI	/sap/opu/odata/SAP/ZRM_BATCH_LEARNING_SRV/$batch					
Protocol	◉HTTP ○HTTPS		Test Group		Test Case	

HTTP Request

Header Name	Value
Content-Type	multipart/mixed;boundary=batch_005056A5-09B1-1ED1-BF82-4...
X-CSRF-Token	30V4_kzMCAkH1h2As72CaQ==

```
1   --batch_005056A5-09B1-1ED1-BF82-409B26A80700
2   Content-Type: application/http
3   Content-Transfer-Encoding: binary
4
5   GET ZEMPLOYEE_DETAILSet(EmpId='0000000001') HTTP/1.1
6
7
8   --batch_005056A5-09B1-1ED1-BF82-409B26A80700|
```

HTTP Response - Processin

Header Name	Value
~status_code	202
~status_reason	Accepted
~server_protocol	HTTP/1.0
content-type	multipart/mixed; bou...

```
1   --D6B9A444A570ED0745F67
2   Content-Type: applicati
3   Content-Length: 1100
4   content-transfer-encodi
5
6   HTTP/1.1 200 OK
7   Content-Type: applicati
8   Content-Length: 988
9   dataserviceversion: 2.0
10
11
```

Some basic framework for execution of $Batch request.

1. Before the GET statement or POST/DELETE/PUT request we will always have the below headers by default
Content-Type: application/http
Content-Transfer-Encoding: binary

2. Within a batch request to segregate each request separately for every new action (GET/CHANGESET) we have to use the prefix "Boundary value"

HTTP Method	○GET ◉POST ○PUT ○PATCH ○MERGE ○DELETE			
Request URI	/sap/opu/odata/SAP/ZRM_BATCH_LEARNING_SRV/$batch			
Protocol	◉HTTP ○HTTPS	Test Group	ZRM_TESTCASE	Test Case

HTTP Request

Header Name	Value
Content-Type	multipart/mixed;boundary=batch_00567
X-CSRF-Token	uEzjmAE-ZKr-ZKXHeZ22Bg==

```
 1    --batch_00567
 2     Content-Type: application/http
 3     Content-Transfer-Encoding: binary
 4
 5    GET ZEMPLOYEE_DETAILSet(EmpId='0000000001') HTTP/1.1
 6
 7
 8    --batch_00567
 9     Content-Type: application/http
10     Content-Transfer-Encoding: binary
11
12    GET ZEMPLOYEE_DETAILSet(EmpId='0000000002') HTTP/1.1
13
14
15    --batch_00567
16     Content-Type: multipart/mixed; boundary=changeset
17
18    --changeset
19     Content-Type: application/http
20     Content-Transfer-Encoding: binary
21
22    DELETE ZEMPLOYEE_DETAILSet(EmpId='0000000002') HTTP/1.1
23
24
25    --changeset
26     Content-Type: application/http
27     Content-Transfer-Encoding: binary
28
29    PUT ZEMPLOYEE_DETAILSet(EmpId='0000000001') HTTP/1.1
30     CONTENT-Type: application/json
31
32     {
33           "EmpId" : "0000000001",
34            "Name" : "DONALD",
35            "Dept" : "DS ABAP",
36            "Designation" : "ASE",
37            "Skillset" : "ABAP",
38            "Experience" : "000002"
39            }
40
41     --changeset
42
43     --batch_00567--
```

And again, within a "Changeset" to segregate each action we need to use boundary value defined for "Changeset" which is passed with begin of content type to segregate "Changeset"

SAP will process the operations such as CREATE/UPDATE/DELETE as it is in the same order, which is defined in the input time.
So it is business responsibility to take care of sequence in which batch "Changeset" calls would be defined.

```
33          "EmpId" : "0000000001",
34           "Name" : "DONALD",
35           "Dept" : "DS ABAP",
36           "Designation" : "ASE",
37           "Skillset" : "ABAP",
38           "Experience" : "000002"
39          }
40
41     --changeset
42
43     --batch_00567--
```

The response of a batch request will exactly correspond to the order of retrieval / change operation in the batch request.

Each response includes a Content-Type header with a value of application/http, and a Content-Transfer-Encoding MIME header with a value of binary.

We can use **one or more Update/delete/insert operation within a "Changeset"** but when you use such template we need to make sure there is no "**Commit work**" statement within any one UPDATE/CREATE/DELETE entity.

If it exists, the **system will dump the request** and no further processing will happen.

Each **Changeset process will be single LUW** (logical unit of work) so ideally no Commit Work statement would be required.

So, each "Changeset" will be either fully processed or complete failure.

So why do I use batch processing in that why for Update/delete/create I must use Changeset?

Performance Improvement -the main reason behind batch processing.

Line No	Subcalls	Level	Location	Class	Method	Duration (ms)	Net Time (ms)
1	1	1	Hub System	/IWFND/CL_SODATA_HTTP_HANDLER	HANDLE_REQUEST	18609	42
2				>Request Payload Size	353 Bytes		
3				>Response Payload Size	77505 Bytes		

Client 099 User SUPPORT Status OK

4	8	2	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	18567	13919
5		3	Hub System	/IWFND/CL_MED_MDL_PROVIDER	GET_SERVICE_GROUP	1	1
6	1	3	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	2197	2194
7	1	4	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	3	3
8		5	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER		
9	1	3	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	2352	2349
10	1	4	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	3	3
11		5	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER		
12	1	3	Hub System	/IWFND/CL_MGW_REQUEST_MANAGER	Call BEP System - TRUSTING@CRT	80	51
13	1	4	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	29	2
14				>RFC Request Size	5614 Bytes		
15				>RFC Response Size	30432 Bytes		
16	1	5	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	PROCESS_BATCH	27	
17	7	6	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	PARALLELIZE_BATCH_QUERIES	27	1
18		7	Backend	>Parallelization Info	Queries=2		
19		7	Backend	>Parallelization Info	ConfigTasks=0, UsedTasks=2		
20		7	Backend	>Parallelization Info	WaitRes=0ms, pRfcEnd=24ms		
21		7	Backend	>Parallelization Info	AppTime=9ms, AppSum=18ms		
22		7	Backend	>Parallelization Info	NonGWTime=0ms		
23	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	26	9
24	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	17	2
25	4	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_SET	15	4
26		10	Backend	/IWBEP/CL_MGW_RUNT_REMOTE_UTIL	AUTHORITY_CHECK_TECH		
27		10	Backend	/IWBEP/CL_MGW_MED_PROVIDER	GET_LAST_MODIFIED		
28		10	Backend	/IWBEP/CL_MGW_RT_SFLIGHT	GET_ENTITYSET	9	9
29		10	Backend	/IWBEP/CL_MGW_DATA_HELPER	CONVERT_ENTITYSET_OUTB	2	2
30	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	25	9
31	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	16	2
32	3	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_SET	14	3
33	1	10	Backend	/IWBEP/CL_MGW_RUNT_REMOTE_UTIL	AUTHORITY_CHECK_TECH		
34		11	Backend	/IWBEP/CL_MGW_MED_PROVIDER	GET_LAST_MODIFIED		
35		10	Backend	/IWBEP/CL_MGW_RT_SFLIGHT	GET_ENTITYSET	9	9
36		10	Backend	/IWBEP/CL_MGW_DATA_HELPER	CONVERT_ENTITYSET_OUTB	2	2
37		3	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_FEED_DATA	13	13

This parallel query process will be executed only for Local and frontend system which has only one registered backend system.

When you use Multi Origin Composition with multiple backend system , the parallel query process will not be triggered each and every request will be processed separately.

Line No	Subcalls	Level	Location	Class	Method	Duration (ms)	Net Time (ms)
1	1	1	Hub System	/IWFND/CL_SODATA_HTTP_HANDLER	HANDLE_REQUEST	560117	21
2				>Request Payload Size	345 Bytes		
3				>Response Payload Size	2584 Bytes		
4	3	2	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	560096	8
5		3	Hub System	/IWFND/CL_MED_MDL_PROVIDER	GET_SERVICE_GROUP	2	2
6	2	3	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	296817	5
7	3	4	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	296812	208917
8		5	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER	1	1
9	1	5	Hub System	/IWFND/CL_MGW_RUNT_RCLNT_PRXY	Call Backend - G4YCLNT000_T	87891	36037
10	1	6	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_READ_ENTITY	51854	77
11				>RFC Request Size	3505 Bytes		
12				>RFC Response Size	1303 Bytes		
13		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY	51777	51777
14		5	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	3	3
15		4	Hub System	/IWFND/CL_SODATA_PROC_DISPTCHR	Lib Serialization - write_to		
16	2	3	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	263269	3
17	3	4	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	263266	17126
18		5	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER		
19	1	5	Hub System	/IWFND/CL_MGW_RUNT_RCLNT_PRXY	Call Backend - G4YCLNT000_T	246139	237075
20	1	6	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_READ_ENTITY	9064	63
21				>RFC Request Size	3505 Bytes		
22				>RFC Response Size	1305 Bytes		
23		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY	9001	9001
24		5	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	1	1
25		4	Hub System	/IWFND/CL_SODATA_PROC_DISPTCHR	Lib Serialization - write_to		

Because in class **/IWFND/CL_TRANSACTION_HANDLER** under method **SET_IS_MDC** is set as abap_true.

In **/IWFND/CL_MGW_RUNT_RCLNT_PRXY** under method **/IWFND/IF_MGW_CORE_RUNTIME~READ_ENTITY** check is made whether it's a multi origin composition request which was set under transaction handler if yes, in method CHECK_USE_CENTRAL_RFC of class **/IWFND/CL_MGW_RUNT_RCLNT_PRXY**

a check is made and single processing of each and every request is processed separately.

```
CHECK_USE_CENTRAL_RFC
METHOD check_use_central_rfc.

    IF mv_is_mdc = abap_true OR mv_icf_root_node = 'sdata'.
      rv_use_central_rfc = abap_false.
    ELSE.
      rv_use_central_rfc = abap_true.
    ENDIF.

ENDMETHOD.
```

Method   /IWFND/IF_MGW_CORE_RUNTIME~READ_ENTITY   Active

```
 90
 91
 92  *        *******************************
 93  *        * Use Central RFC to Backend *
 94  *        *******************************
 95      IF check_use_central_rfc( ls_system_alias_info-gwbep_version ) = abap_true OR
 96         mv_process_mode = /iwfnd/if_mgw_core_types=>gcs_process_mode-co_deployed_only.
 97        mo_request_manager->read_entity(
 98          EXPORTING
 99            iv_destination      = lv_destination
100            is_system_alias_info = ls_system_alias_info
101            io_logger           = lo_logger
102            iv_log_msg_handle   = mv_msg_handle
103            iv_entity_name      = iv_entity_name
104            iv_entity_set_name  = iv_entity_set_name
105            is_request_details  = is_request_details
106            it_parameter        = it_parameter
107            iv_inlines          = lv_inlines
108          IMPORTING
109            et_custom_header    = ct_headers
110            er_entity           = cr_entity
111            es_response_context = cs_response_context
112            et_expand_skiptoken = ct_expand_skiptoken
113            et_inline_info      = ct_inline_info
114          ).
115        cv_is_target_format = abap_false.
116        RETURN.
117      ENDIF.
118
```

When using Multi Origin Composition separately for an Entity Set parallelization will be enabled automatically in each of the system alias.

Line No	Subcalls	Level	Location	Class	Method	Duration (ms)	Net Time (ms)
1	1	1	Hub System	/IWFND/CL_SODATA_HTTP_HANDLER	HANDLE_REQUEST	243	22
2				>Request Payload Size	0 Bytes		
3				>Response Payload Size	28258 Bytes		
4	3	2	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	221	5
5		3	Hub System	/IWFND/CL_MED_MDL_PROVIDER	GET_SERVICE_GROUP	1	1
6	3	3	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	215	6
7		4	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER	1	1
8	1	4	Hub System	/IWFND/CL_MGW_MDC_DATA	READ_ENTITYSET	204	
9	2	5	Hub System	/IWFND/CL_MGW_MDC_DATA	Parallelize Read EntitySet	204	38
10	1	6	Hub System	/IWFND/CL_MGW_MDC_DISPATCHER	Call Backend - G4YCLNT000_T	46	33
11		7	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	13	13
12				>RFC Request Size	3452 Bytes		
13				>RFC Response Size	6466 Bytes		
14	1	6	Hub System	/IWFND/CL_MGW_MDC_DISPATCHER	Call Backend - NONE	166	35
15	2	7	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	131	8
16				>RFC Request Size	3437 Bytes		
17				>RFC Response Size	2292 Bytes		
18	1	8	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_SET	10	6
19		9	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITYSET	4	4
20		8	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_SET	129	129
21		4	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_FEED_DATA	4	4
22		3	Hub System	/IWFND/CL_SODATA_PROC_DISPTCHR	Lib Serialization - write_to		

The other way of calling batch request with multi origin request if you want the data to be retrieved from single backend only we can use Origin option in the URI.

Example: /sap/opu/odata/SAP/ZRM_BATCH_LEARNING_SRV;o=GXX_000/$batch

This will enable parallelization if the required configuration in done in backend.

Line No	Subcalls	Level	Location	Class	Method	Duration (ms)	Net Time (ms)
4	8	2	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	126	10
5		3	Hub System	/IWFND/CL_MED_MDL_PROVIDER	GET_SERVICE_GROUP	1	1
6	1	3	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	6	3
7	1	4	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	3	3
8		5	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER		
9	1	3	Hub System	/IWFND/CL_SODATA_ROOT_HANDLER	DISPATCH	3	2
10	1	4	Hub System	/IWFND/CL_SODATA_PROCESSOR	READ	1	1
11		5	Hub System	/IWFND/CL_MGW_PROV_DELEGATOR	GET_DATA_PROVIDER		
12	1	3	Hub System	/IWFND/CL_MGW_REQUEST_MANAGER	Call BEP System - G4YCLNT000_T	103	13
13	1	4	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	90	3
14				>RFC Request Size	6583 Bytes		
15				>RFC Response Size	6444 Bytes		
16	1	5	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	PROCESS_BATCH	87	
17	7	6	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	PARALLELIZE_BATCH_QUERIES	87	2
18		7	Backend	>Parallelization Info	Queries=2		
19		7	Backend	>Parallelization Info	ConfigTasks=7, UsedTasks=2		
20		7	Backend	>Parallelization Info	WaitRes=0ms, pRfcEnd=11ms		
21		7	Backend	>Parallelization Info	AppTime=0ms, AppSum=0ms		
22		7	Backend	>Parallelization Info	NonGWTime=0ms		
23	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	83	8
24	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	75	3
25	1	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	72	72
26		10	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY		
27	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	85	11
28	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	74	3
29	1	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	71	71
30		10	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY		
31		3	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	2	2
32		3	Hub System	/IWFND/CL_SODATA_PROCESSOR	Lib Serialization - write_to		
33		3	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	1	1
34		3	Hub System	/IWFND/CL_SODATA_PROCESSOR	Lib Serialization - write_to		

From SAP 740 SP09 Batch processing, performance has been improved by introducing new API for Changeset processing in defer mode.

The interface /IWBEP/IF_MGW_APPL_SRV_RUNTIME and the method CHANGESET_BEGIN,CHANGESET_PROCESS,CHANGESET_END will be implemented in each DPC_EXT class

/IWBEP/IF_MGW_APPL_SRV_RUNTIME~CHANGESET_BEGIN, /IWBEP/IF_MGW_APPL_SRV_RUNTIME~CHANGESET_PROCESS, /IWBEP/IF_MGW_APPL_SRV_RUNTIMECHANGESET_END.

Deferred mode: For Performance improvement

Each change set processing can also be improved if the data provider can handle the whole change set at once.

That means the provider must implement the new API for change set handling to process all change set operations within the new API **CHANGESET_PROCESS**.

In this case a data provider must return the result of all operations back to the gateway framework.
The below difference in call stack can be seen clearly.

Average Times (in milliseconds)

No. of Requests	Processing Time	SAP GW Hub Sy...	RFC and Networ...	SAP GW Backen...	Application	Non-GW
1	129	67	16	42	3	1

With DEFER mode enabled

Line No	Subcalls	Level	Location	Class	Method	Duration (ms)	Net Time (ms)
34		7	Backend	>Parallelization Info	NonGWTime=0ms		
35	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	21	12
36	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	9	3
37	1	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	6	6
38		10	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY		
39	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	17	8
40	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	9	3
41	1	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	6	6
42		10	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY		
43	1	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	6	6
44		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_BEGIN		
45	2	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	4	2
46		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_PROCESS	2	2
47		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_END		
48	1	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	1	1
49		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_BEGIN		
50	2	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	4	3
51		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_PROCESS	1	1
52		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_END		

Average Times (in milliseconds)

No. of Requests	Processing Time	SAP GW Hub Sy...	RFC and Networ...	SAP GW Backen...	Application	Non-GW
1	131	70	16	39	5	1

Line No	Subcalls	Level	Location	Class	Method	Duration (ms)	Net Time (ms)
36	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	10	3
37	1	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	7	7
38		10	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY		
39	1	7	Backend	/IWBEP/CL_MGW_QUERY_SCHEDULER	Call Parallel Query	19	11
40	1	8	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	8	3
41	1	9	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	5	5
42		10	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	GET_ENTITY		
43	2	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	7	6
44		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_BEGIN		
45		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CREATE_ENTITY	1	1
46	2	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	3	1
47		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CREATE_ENTITY	2	2
48		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_END		
49	2	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	2	1
50		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_BEGIN		
51		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CREATE_ENTITY	1	1
52	2	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	CREATE_ENTITY_TYPE	2	1
53		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CREATE_ENTITY	1	1
54		7	Backend	ZCL_ZRM_BATCH_CONCEPT_DPC_EXT	CHANGESET_END		

When we intend to use **DEFER** mode its must to redefine **/IWBEP/IF_MGW_APPL_SRV_RUNTIME~CHANGESET_BEGIN** of the service, this is where we need to set **CV_DEFER_MODE = ABAP_TRUE**.

There is an option if you want to **disable defer mode for certain Entity type, Operation Information** so it will follow normal process, instead of hitting **CHANGESET_PROCESS**.

CHANGESET_BEGIN method has importing parameter **IT_OPERATION_INFO** which has ENTITY_TYPE, ENTITY SET, OPERATION_TYPE, CONTENT_ID, CONTENT_ID_REF fields which gives us a chance to decide if we want to switch **CV_DEFER_MODE** on or off.

In simple **the response structure for all the entities** will be set together in case of DEFER Mode with changing parameter table **CT_CHANGESET_RESPONSE**.

Either full response or no response.

In /IWBEP/IF_MGW_APPL_SRV_RUNTIME~CHANGESET_PROCESS we have importing parameter IT_CHANGESET_REQUEST.

In the internal table, IT_CHANGESET_REQUEST we have a field called 'REQUEST_CONTEXT' which bears entity specific details this must be down casted to a class '/IWBEP/IF_MGW_REQ_ENTITY_C' method 'GET_ENTITY_TYPE_NAME' to have only Entity Type specific information so that we can retrieve the Entity Type and do the required action as per field "OPERATION_TYPE".

The field "ENTRY_PROVIDER" in internal table has the data related to 'Entity'. This field has reference to interface class '/IWBEP/IF_MGW_ENTRY_PROVIDER 'the method 'READ_ENTRY_DATA' will get the data in result structure as per entity structure dynamically.

The **Changeset request-operation number** should be set to field Changeset response-operation number structure because the operation number is a unique field which maps to the output request order as per input request order.

```abap
    BEGIN OF ty_s_changeset_request,
      operation_type  TYPE /iwbep/mgw_operation_type,    " See GCS_OPERATION_TYPE
      operation_no    TYPE i,
      media_resource  TYPE ty_s_media_resource,   " CREATE_STREAM and UPDATE_STREAM only
      slug            TYPE string,                " CREATE_STREAM only
      request_headers TYPE tihttpnvp,
      request_context TYPE REF TO object,
      entry_provider  TYPE REF TO /iwbep/if_mgw_entry_provider,
      expand_node     TYPE REF TO /iwbep/if_mgw_odata_expand,
      msg_container   TYPE REF TO /iwbep/if_message_container,
      content_id      TYPE string,   " Condent ID
      content_id_ref  TYPE string,   " Condent ID Reference
    END OF ty_s_changeset_request .
  types:
    ty_t_changeset_request TYPE STANDARD TABLE OF ty_s_changeset_request WITH KEY operation_no .
  types:
    BEGIN OF ty_s_changeset_response,
      operation_no TYPE i,
      entity_data  TYPE REF TO data,
      headers      TYPE tihttpnvp,
    END OF ty_s_changeset_response .
  types:
    ty_t_changeset_response TYPE SORTED TABLE OF ty_s_changeset_response WITH UNIQUE KEY operation_no
```

Ty.	Parameter	Type spec.	Description
▶□	IT_CHANGESET_REQUEST	TYPE /IWBEP/IF_MGW_APPL_TYPES=>TY_T_CHANGESET_REQUEST	
▶□▶	CT_CHANGESET_RESPONSE	TYPE /IWBEP/IF_MGW_APPL_TYPES=>TY_T_CHANGESET_RESPONSE	
⚡	/IWBEP/CX_MGW_BUSI_EXCEPTION		Business Exception
⚡	/IWBEP/CX_MGW_TECH_EXCEPTION		Technical Exception

Method `/IWBEP/IF_MGW_APPL_SRV_RUNTIME~CHANGESET_PROCESS`   Active

```abap
  1  METHOD /iwbep/if_mgw_appl_srv_runtime~changeset_process.
  2    DATA:
  3          ls_changeset_request   TYPE /iwbep/if_mgw_appl_types=>ty_s_changeset_request,
  4          ls_changeset_response  TYPE /iwbep/if_mgw_appl_types=>ty_s_changeset_response,
  5          lv_entity_type         TYPE string,
  6          lo_create_context      TYPE REF TO /iwbep/if_mgw_req_entity_c,
  7          ls_salary              TYPE zemployee_salary,
  8          ls_employee            TYPE zemployee_detail.
  9  *     BREAK-POINT.
 10
 11      "Here I am segregating the request for each Delete, Create,Update operation separately for easier understanding.
 12      LOOP AT it_changeset_request INTO ls_changeset_request WHERE operation_type = 'DE'.   "delete entity
 13
 14        lo_create_context ?= ls_changeset_request-request_context.   "dpwncasting -from more general source to specific target
 15        lv_entity_type = lo_create_context->get_entity_type_name( ).
 16
 17        CASE lv_entity_type.
 18
 19          WHEN 'ZEMPLOYEE_SALARY'.
 20            ls_changeset_request-entry_provider->read_entry_data( IMPORTING es_data = ls_salary ).   "extract information from the request
 21
 22            SELECT SINGLE *
 23              FROM zemployee_salary
 24              INTO ls_salary
 25              WHERE empid = ls_salary-empid.
 26
 27            IF sy-subrc EQ 0.
 28              DELETE FROM zemployee_salary WHERE empid = ls_salary-empid.   "delete from DB table
 29            ENDIF.
 30            IF sy-subrc = 0.   "feed the response to GW CLIENT if the request is sucessful
```

```abap
 31              copy_data_to_ref(
 32                EXPORTING
 33                  is_data = ls_salary
 34                CHANGING
 35                  cr_data = ls_changeset_response-entity_data ).
 36            ENDIF.
 37            ls_changeset_response-operation_no = ls_changeset_request-operation_no. "this is must because to map as per operation # defined in request,otherwise dump
 38            APPEND  ls_changeset_response TO ct_changeset_response. "Accumulate the response for GW CLIENT
```

The best use for "**Defer Mode**" is for '**CREATE**' request in case of $batch request, the use can be identified by using a '**CONTENT_ID**' and '**CONTENT_ID_REF**' of '**IT_CHANGESET_REQUEST**' parameter in '**CHANGESET_PROCESS**'.

If a hierarchical CREATE request is to be done, via batch processing in a single Changeset we can use this '**CONTENT_ID**' concept.

Example: I have CHANGESET request where I must create 'Sales Order Header' entity 'Sales Order Item' entity.

In this case I either want to create both sales order header and item entity using the REQUEST information or nothing at all.

In this case I can use **CHANGESET_BEGIN** and **CHANGESET_PROCESS** method to ensure my success.

The $BATCH navigation and framework expand works like non-batch process.

Frame work expand: This will expand both the principal entity and dependent entity in URI.

Two entity results will be displayed

/sap/opu/odata/SAP/ZRM_BATCH_LEARNING_SRV/ZEMPLOYEE_DETAILSet(EmpId='0000000004')?$expand=ZEMPLOYEE_SALARY

Navigation: This will expand only the depend entity based on key field from principal entity.

Data-Provider Expand: This will work like Frame work expand but here we can alter the return entity structure such that both the principal and dependent entity will be under one result structure (ER_ENTITY)

Deferred response Creation for Batch -Only GET requests

It will **deactivate** BATCH parallelization and CRP handling.

Attribute: MV_BATCH_DEFERRED_RESP_CREA

This feature has to be enabled in MPC_EXT class of a service .

Sample implementation:

```abap
method DEFINE.
  super->define( ).

  DATA: ls_model_features TYPE /iwbep/if_mgw_appl_types=>ty_s_model_features.
  ls_model_features-use_deferred_batch_resp_crea = abap_true.
  model->set_model_features( EXPORTING
                               is_model_features = ls_model_features ).
endmethod.
```

Class/Interface	/IWBEP/CL_MGW_ABS_MODEL	Implemented / Active

Properties | Interfaces | Friends | **Attributes** | Methods | Events | Types | Aliases

Properties | | Filter

Attribute	Level	Visibility	R...	Typing	Associated Type
MODEL	Instance Attribute	Public	☐	Type Ref To	/IWBEP/IF_MGW_ODATA_MODEL

Interface	/IWBEP/IF_MGW_ODATA_MODEL	Implemented / Active

Properties | Interfaces | Attributes | **Methods** | Events | Types | Aliases

Parameters of Method   SET_MODEL_FEATURES

← Methods | ⚡ Exceptions | | Properties

Parameter	Type	P...	O...	Typing Method	Associated Type	Default
IS_MODEL_FEATURES	Importing	☐	☐	Type	/IWBEP/IF_MGW_APPL_TYPES=>TY_S	
		☐	☐	Type		

```
types:
  BEGIN OF ty_s_model_features,
    use_cache_handshake_busi_req TYPE abap_bool, " Activates the cache handshake for business requests
    use_long_label_for_property  TYPE abap_bool, " Label for properties based on DDIC elements will be taken from long description
    use_edm_type_mapping_sp10    TYPE abap_bool, " Use the EDM type mapping as developed in SP10
    use_edm_type_mapping_v15     TYPE abap_bool, " Use all RAW16 based domains as Edm.Guid (use_edm_type_mapping_sp10 will be set automatically)
    use_shorttext_for_exceptions TYPE abap_bool, " For T100 Exception texts always use the shorttext and not the longtext
    use_crp_by_default           TYPE abap_bool, " All entity sets of this service supports "Cache Request Processing" (CRP) by
    " default. Can be overwritten via /IWBEP/IF_MGW_ODATA_ENTITY_SET->set_use_crp
    use_auto_uppercase_conv      TYPE abap_bool, " Automatically determine uppercase properties and translate to uppercase during inbound processing
    renounce_anno_use_in_dpc     TYPE abap_bool, " The DPC doesn´t read the annotations
    use_deferred_batch_resp_crea TYPE abap_bool, " Use deferred batch response creation (disables CRP and parallelization in $batch)
    use_strict_decimal_check     TYPE abap_bool, " Perform on deserialization of Edm.Decimal typed properties facet checking, i.e. check precision, scale
  END OF ty_s_model_features .
```

There are two main methods introduced in DPC generator class

/IWBEP/CL_MGW_ABS_DATA.
/IWBEP/IF_MGW_CORE_SRV_RUNTIME~BATCH_BEGIN
/IWBEP/IF_MGW_CORE_SRV_RUNTIME~BATCH_END

The logic in above BATCH_BEGIN method will check if there any request other than READ request .

It will allow only GET_ENTITY
GET_ENTITYSET
EXPAND_ENTITY
EXPAND_ENTITYSET
GET_ENTITYSET_DELTA.

If any other operations (Changeset) are present, the **Deferred response creation** mode will be disabled.

The implementation to enable **Deferred response creation** must be done in method /IWBEP/IF_MGW_APPL_SRV_RUNTIME~BATCH_BEGIN.

When a batch request is executed in case of Hubway and Gateway **/IWBEP/CL_MGW_REMOTE_HANDLER** will be executed **PROCESS_BATCH**, in case of co-deployed **/IWBEP/CL_MGW_LOCAL_HANDLER** and same method name **PROCESS_BATCH**.

The **BATCH_BEGIN** and **BATCH_END** if once implemented for a service, **IT_REQUEST_HEADER** will have value 'SAP-IW-BATCH_DEF_RESP_CREA'.

So when the class **/IWBEP/CL_MGW_REMOTE_HANDLER** or **/IWBEP/CL_MGW_LOCAL_HANDLER** calls **PROCESS_BATCH** method, if the above request header is set .

The flag for **Deferred response creation** will be set.

The execution will be done based on no of operations (CRUD) operations in $batch request.

Class: /IWBEP/CL_MGW_REMOTE_HANDLER or /IWBEP/CL_MGW_LOCAL_HANDLER
Method: PROCESS_BATCH

When processing the batch request first check will be made for each if its if its 'Query' ('GET')request or CHANGESET (Modify operations) request.

Query: LS_BATCH_PACKET-PACKET = 'Q'

Changeset: LS_BATCH_PACKET-PACKET = 'C'

Batch request will be processed in packets of information-so first let's see how query request will be categorized further.

Only One 'GET' Request in $batch request:

If **only one** request/Operation is present in the received **BATCH** request, it will be direct call for processing the request without using batch parallelization concept.

This will be done in method '**PROCESS_SINGLE_BATCH_QUERY**' the logic.

Based on function code value in structure '**IS_BATCH_INFO_REQUEST-FUNCTION_CODE**' whether its Entity Type, Entity Set, Update entity, Create Entity, Delete Entity and some other operations based on the request received.

| Desktop 1 | Desktop 2 | Desktop 3 | Standard | Structures | Tables | Objects | Detail | Data |

| Structures | Fld.list |

Struct.   LS_BATCH_INFO

Struc. Type   Structure: deep(92)

Exp.	Component	Val...	Val.	Ch...	Technical Type	Hexade
	PACKET_NO		1	✏	I(4)	010000
	OPERATION_NO		1	✏	I(4)	010000
	CHANGESET			✏	CString{0}	
	FUNCTION_CODE		ET	✏	CString{2}	450054
	XML_OFFSET		6	✏	I(4)	060000
	XML_SIZE		3271	✏	I(4)	C70C00
	CONTENT_TYPE		xml	✏	CString{3}	78006D
	ENTITY_SET		ZEMPLOYEE_DETAILSet	✏	CString{19}	5A0045
	ENTITY_TYPE		ZEMPLOYEE_DETAIL	✏	CString{16}	5A0045
	ACTION_NAME			✏	CString{0}	
	OPERATION_STATE			✏	C(1)	2000
	IS_STREAM		–	✏	C(1)	2D00
	IS_DEEP_INSERT		–	✏	C(1)	2D00

```
16   * Set Request Data
17     lv_op_request_data = iv_request_data+is_batch_info_request-xml_offset(is_ba
18
19   * Set Request Header
20     ls_op_request_header-name  = co_header_fcode.
21     ls_op_request_header-value = is_batch_info_request-function_code.
22     INSERT ls_op_request_header INTO TABLE lt_op_request_header.
23
24   * set soft-state mode
25   |   CLEAR: ls_op_request_header.
26     ls_op_request_header-name  = co_header_soft_state.
27     ls_op_request_header-value = is_batch_info_request-is_soft_state.
28     INSERT ls_op_request_header INTO TABLE lt_op_request_header.
```

| Variables 1 | Variables 2 | Locals | Globals | Auto | Memory Analys |

St...	Variable	V...	Val.
⚡	LS_BATCH_PACKET-PACK		
	IS_BATCH_INFO_REQUES		ET
	CO_HEADER_FCODE		sap-iw-bep-method
⚡	LS_BATCH_INFO		

The method **PROCESS_REQUEST** will process the request related to retrieval of data.

The export structure **IT_REQUEST** header will have the function code value.

```
38   * Process Query
⇨ 39     process_request(
40       EXPORTING
41         iv_request_data    = lv_op_request_data
42         it_request_header  = lt_op_request_header
43       IMPORTING
44         ev_response_data   = lv_op_response_data
45         et_response_header = lt_op_response_header
46     ).
```

Multiple GET request in $batch request: A check will be made if the service is enabled for 'Parallelization' with below class and method

Class/Method: /IWBEP/CL_SUTIL_RUNTIME-> GET_BATCH_CONFIG.

This will check in Global configuration /N/IWBEP/GLOBAL_CONFIG give maximum no. of parallel processing request and if batch parallelization is enabled for service.

This will in turn check for that service if parallelization is disabled with the below class.

Class/Method: /IWBEP/CL_SCO_MANAGER=>IS_BATCH_PARAL_DISABLED
The class which will parallelize the incoming request with below class

Class/Method: /IWBEP/CL_MGW_QUERY_SCHEDULER=>PARALLELIZE_BATCH_QUERIES

Class/Method: /IWBEP/CL_MGW_REMOTE_HANDLER / PROCESS_READ_PACKAGE

Variable: LV_USE_DEFERRED_RESP_CREA
will be used if BATCH deferred response creation is used and implemented using BEGIN_BATCH method.

So, this way even for GET request we can use Deferred response either all or none (results)

The each individual request will be processed first in
Method: **PROCESS_REQUEST_INT**, for entity read, delete, update, create entity , metadata, vocabulary text retrieval request

The response is built using this

Method	PROCESS_READ_PACKAGE	Active

```abap
220        IF sy-subrc EQ 0.
221          build_response_data(
222            EXPORTING
223              is_batch_response        = ls_batch_response
224              io_read_package_info     = lo_read_package_info
225              is_batch_perf_data       = <ls_batch_perf_data>
226            IMPORTING
227              ev_response_data         = lv_op_response_data
228            CHANGING
229              cs_batch_response_info = ls_batch_info_response ).
230        ELSE.
231          build_response_data(
232            EXPORTING
233              is_batch_response        = ls_batch_response
234              io_read_package_info     = lo_read_package_info
235            IMPORTING
236              ev_response_data         = lv_op_response_data
237            CHANGING
238              cs_batch_response_info = ls_batch_info_response ).
239        ENDIF.
240
241        INSERT ls_batch_info_response INTO TABLE ct_batch_info_response.
242
243        CONCATENATE cv_response_data
244                    lv_op_response_data
245          INTO cv_response_data IN BYTE MODE.
```

Error handling:

Either display all or nothing even for GET requests similar to CHANGESET request.

```
PROCESS_READ_PACKAGE                                          Active

      mv_io_type = 1.
    ENDIF.

    process_request_int(
      EXPORTING
        it_request_header      = lt_op_request_header
        io_read_package_info = lo_read_package_info
      IMPORTING
        ev_batch_error         = ev_batch_error
        ev_response_data       = lv_op_response_data
        et_response_header     = lt_op_response_header ).

    mv_io_type = mv_io_type_main.


    IF ev_batch_error EQ abap_true.
      " ends complete batch processing
      " method returns current exception response only

      cv_response_data = lv_op_response_data.
```
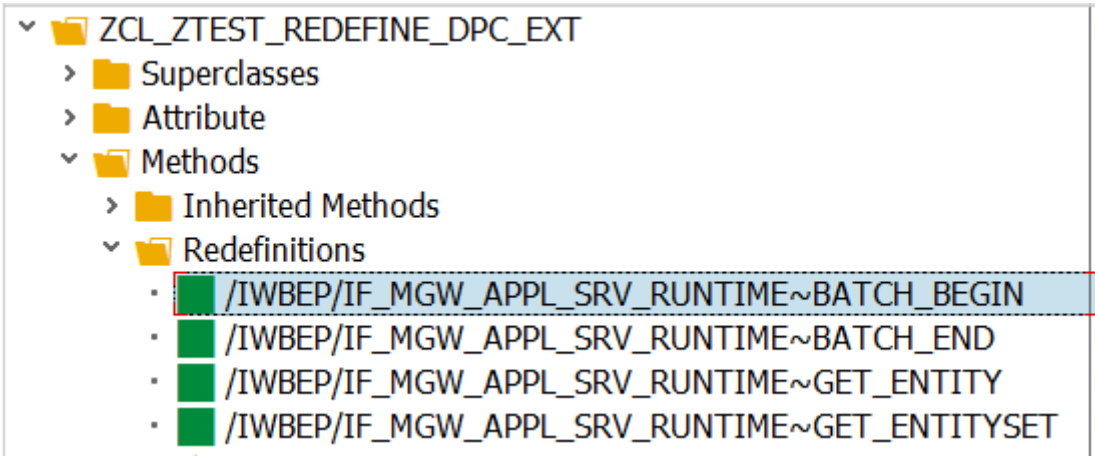
Implementation example for Batch -Deferred mode response creation

Redefinition has to be done for below methods

Additionally, if required for your use case it has to be done for below methods(busniess case)
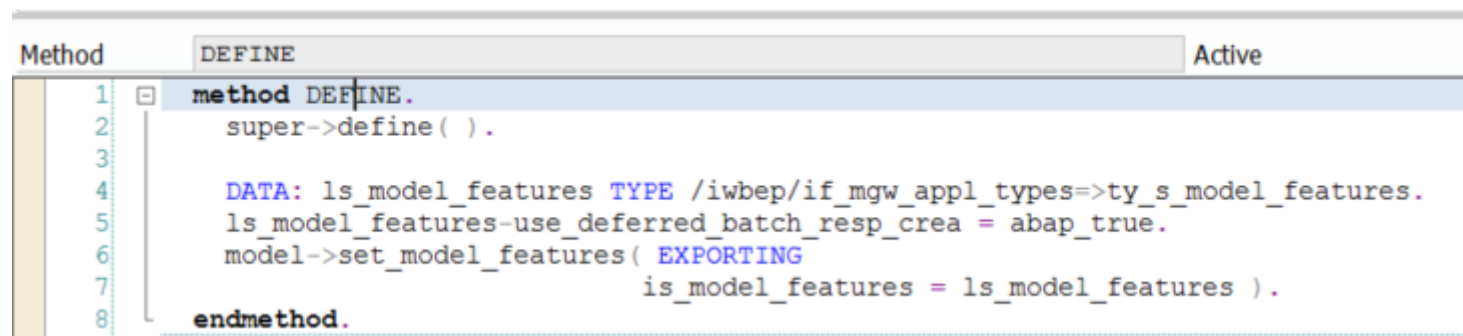
/IWBEP/IF_MGW_APPL_SRV_RUNTIME~EXPAND_ENTITY
/IWBEP/IF_MGW_APPL_SRV_RUNTIME~EXPAND_ENTITYSET
/IWBEP/IF_MGW_APPL_SRV_RUNTIME~GET_ENTITYSET_DELTA

Sample implementation:

Step1:

First to enable Batch deferred response mode enable it in MPC_EXT model features as explained previously.


```
Method          DEFINE                                                          Active
    1  ⊟   method DEFINE.
    2          super->define( ).
    3
    4          DATA: ls_model_features TYPE /iwbep/if_mgw_appl_types=>ty_s_model_features.
    5          ls_model_features-use_deferred_batch_resp_crea = abap_true.
    6          model->set_model_features( EXPORTING
    7                                 is_model_features = ls_model_features ).
    8      └ endmethod.
```

Step2:
Redefine method and set the flag as Deferred response creation as ABAP_TRUE.

Method	/IWBEP/IF_MGW_APPL_SRV_RUNTIME~BATCH_BEGIN

```
1    method /IWBEP/IF_MGW_APPL_SRV_RUNTIME~BATCH_BEGIN.
2        EV_DEFERRED_RESPONSE_CREATION = abap_true.
3    endmethod.
```
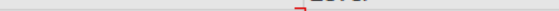
Step3:
Introduce a new table attribute in DPC_EXT class.
This is to consolidate the response from GET ,EXPANDED (entity, entity set) and use it in BATCH_END class to display the response in one time.

Example:

Class/Interface	ZCL_ZTEST_REDEFINE_DPC_EXT	Implemented / Active

Properties	Interfaces	Friends	Attributes	Methods	Events	Types	Aliases

Properties   ☑ Filter

Attribute	Level	Visibility	R...	Typing	Associated Type
MT_BATCH_GET_REPSONSE	Instance Attribute	Private	☐	Type	/IWBEP/IF_MGW_APPL_TYPES=>TY_T_BATCH_RESPONSE

Step4: Now you must redefine GET, EXPANDED (entity, entity set) as below for interface
/IWBEP/IF_MGW_APPL_SRV_RUNTIME.
This is required to consolidate the response and display in one shot in BATCH_END method.

```
11  CASE lv_entityset_name.
12  *----------------------------------------------------------------*
13  *              EntitySet -   ZEMPLOYEE_SALARYSet
14  *----------------------------------------------------------------*
15       WHEN 'ZEMPLOYEE_SALARYSet'.
16  *      Call the entity set generated method
17          zemployee_salary_get_entity(
18              EXPORTING iv_entity_name       = iv_entity_name
19                        iv_entity_set_name = iv_entity_set_name
20                        iv_source_name       = iv_source_name
21                        it_key_tab           = it_key_tab
22                        it_navigation_path = it_navigation_path
23                        io_tech_request_context = io_tech_request_context
24              IMPORTING er_entity            = zemployee_salary_get_entity
25                        es_response_context = es_response_context
26          ).
27
28          IF zemployee_salary_get_entity IS NOT INITIAL.
29  *      Send specific entity data to the caller interface
30          copy_data_to_ref(
31              EXPORTING
32                is_data = zemployee_salary_get_entity
33              CHANGING
34                cr_data = er_entity
35          ).
36
37          DATA ls_batch_at_once_simulate TYPE /iwbep/if_mgw_appl_types=>ty_s_batch_response.
38          clear ls_batch_at_once_simulate.
39          io_tech_request_context->get_batch_operation_id(
40            IMPORTING
41              ev_batch_operation_id        = ls_batch_at_once_simulate-operation_id ).
42          ls_batch_at_once_simulate-response_data = er_entity.
43          INSERT ls_batch_at_once_simulate INTO TABLE mt_batch_get_repsonse.
44          ELSE.
45  *      In case of initial values - unbind the entity reference
46          er_entity = lr_entity.
47          ENDIF.
```

Step5:

Consolidate and display the result as below in BATCH_END method.

Method	/IWBEP/IF_MGW_APPL_SRV_RUNTIME~BATCH_END	Activ

```
1 ⊟   method /IWBEP/IF_MGW_APPL_SRV_RUNTIME~BATCH_END.
2
3 ⊟     IF mt_batch_get_repsonse[] IS NOT INITIAL.
4         ct_batch_response[] = mt_batch_get_repsonse[].
5       ENDIF.
6     endmethod.
```

Call Stack: With Deferred response creation enabled

19	1	4 Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	27	3
20			>RFC Request Size	13689 Bytes		
21			>RFC Response Size	9143 Bytes		
22	1	5 Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	PROCESS_BATCH	24	9
23	4	6 Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	15	8
24	1	7 Backend	/IWBEP/CL_MGW_RUNT_REMOTE_UTIL	AUTHORITY_CHECK_TECH	1	1
25		8 Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	BATCH_BEGIN		
26	1	7 Backend	/IWBEP/CL_MGW_MED_PROVIDER	GET_LAST_MODIFIED	1	
27		8 Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
28	2	7 Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	1	1
29		8 Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
30	1	8 Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	1	
31		9 Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
32	1	7 Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	4	3
33	1	8 Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
34		9 Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	BATCH_END		
35		3 Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	3	3
36		3 Hub System	/IWFND/CL_SODATA_PROCESSOR	Lib Serialization - write_to		
37		3 Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	1	1
38		3 Hub System	/IWFND/CL_SODATA_PROCESSOR	Lib Serialization - write_to		

With Deferred response creation disabled.
Line 34 in call stack is different

#			System	Class	Method		
19	1	4	Backend	REMOTE_FUNCTION_MODULE	/IWBEP/FM_MGW_HANDLE_REQUEST	19	2
20				>RFC Request Size	13689 Bytes		
21				>RFC Response Size	8787 Bytes		
22	1	5	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	PROCESS_BATCH	17	8
23	4	6	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	9	2
24	1	7	Backend	/IWBEP/CL_MGW_RUNT_REMOTE_UTIL	AUTHORITY_CHECK_TECH	1	1
25		8	Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	BATCH_BEGIN		
26	1	7	Backend	/IWBEP/CL_MGW_MED_PROVIDER	GET_LAST_MODIFIED	2	1
27		8	Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
28	2	7	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	2	1
29		8	Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
30	1	8	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	2	1
31		9	Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
32	1	7	Backend	/IWBEP/CL_MGW_REMOTE_HANDLER	GET_ENTITY_TYPE	2	1
33		8	Backend	ZCL_ZTEST_REDEFINE_DPC_EXT	GET_ENTITY	1	1
34		3	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	3	3
35		3	Hub System	/IWFND/CL_SODATA_PROCESSOR	Lib Serialization - write_to		
36		3	Hub System	/IWFND/CL_SODATA_MAPPER	GET_ENTITY_PROV_BY_ENTRY_DATA	1	1
37		3	Hub System	/IWFND/CL_SODATA_PROCESSOR	Lib Serialization - write_to		

Assigned tags

NW ABAP Gateway (OData) | OData | SAP Gateway | /IWBEP/IF_MGW_APPL_SRV_RUNTIME~CHANGESET_PROCESS | $batch changeset process |

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17 Comments

Syam Babu

May 6, 2018 at 6:00 am

Hi Mani,

Indeed Blog for GW developers on BATCH processing in nowadays.

Thanks,

Syam

Like (0)

Manikandan Rajasekaran | Post author

May 7, 2018 at 8:43 am

Thanks Syam 🙂

Like (0)

Bilen Cekic

May 6, 2018 at 7:41 am

Is there any difference between using batch or sending 2 parallel process from Ui5 side ? (for GET method).

Like (0)

Manikandan Rajasekaran | Post author

May 7, 2018 at 8:54 am

Hi Bilen,

Conceptual wise both are same, but $batch request is Gateway framework induced to improve the response time, by parallel processing of the READ requests and it gives you flexibility to make synchronous read (Either All the request should be processed successfully or none -with BATCH_BEGIN).

Like (0)

Alexander K

May 8, 2018 at 2:18 am

Thanks for blog, *Manikandan Rajasekaran*

Can you help me with my question?

I have creating ListReport with AnalyticalTable and user in ListReport setting panel selet some field for grouping

Can I get group fields(fields for group by) from parameter IO_TECH_REQUEST_CONTEXT of method Z_*_DPC_EXT->Z_*_GET_ENTITYSET ?

I see 3 requests in network panel of browser.

For items, for groups and for totals. How can I find out request for groups ?

Like (0)

Manikandan Rajasekaran | Post author

May 11, 2018 at 5:51 am

The parameter, IO_TECH_REQUEST_CONTEXT has two parameters

1.MR_REQUEST will contain information related to the service, service version being called , by which user etc.

2.There is another parameter MO_MODEL which has complete details of Model related information -Entities, association, mapping related information.

Like (0)

Alexander K

May 14, 2018 at 1:29 am

Thanks, *Manikandan Rajasekaran*.

I am trying to find in MO_MODEL.

Like (0)

Ashwin Bhaskar

May 11, 2018 at 2:19 am

Excellent Share. Thanks

Like (1)

Manikandan Rajasekaran | Post author

May 11, 2018 at 6:10 am

Thanks 🙂

Like (0)

Alexander K

May 14, 2018 at 1:36 am

Thanks again. I have another question.

Can I change filter in parameter, IO_TECH_REQUEST_CONTEXT ? I need to clear one filter from odata service.

Like (0)

Manikandan Rajasekaran | Post author

May 14, 2018 at 9:44 am

Yeah, you will have the Filter parameters in attribute MR_REQUEST.

Like (0)

Srinivas Rao

June 17, 2018 at 4:38 pm

Hi Manikandan,

Thanks for the wonderful blog. I came across this blog while searching for possibility of using batch for GET media streams in succession. Could you please let me know if that is possible and how to put each request in batch for the GET stream ? Could you please explain this with an example ?

Thanks & Regards

Srinivas Rao.

Like (0)

Manikandan Rajasekaran | Post author

August 6, 2018 at 10:11 am

Hi Srinivas,

If my understanding is clear you want to retrieve the GET media request if the earlier one is success else it should not ? If yes, you can search for **Variable:** LV_USE_DEFERRED_RESP_CREA in my blog which will give insight with an example.

Like (0)

Rajesh Paruchuru

October 23, 2018 at 11:29 am

Hello Manikandan

some of the features explained in the blog are not available in our backend system but are available in our hub system, for ex: the attribute "use_deferred_batch_resp_crea" in /IWBEP/IF_MGW_APPL_TYPES=>TY_S_MODEL_FEATURES and the methods BATCH_BEGIN and BATCH_END are not available in our back end system but are available in our hub system, with this kind of set up, is there any way that we can implement deferred processing for GET only requests in batch mode?

Thanks

Rajesh

Like (0)

Manikandan Rajasekaran | Post author

December 27, 2018 at 12:14 pm

Sorry Rajesh, I think you can't

Like (0)

Asif Pasha Shaik

February 11, 2019 at 7:52 pm

Dear Manikandan,

First of all thank you very much for sharing this post.

I have a question.

I am creating Multiple document numbers using BAPI_DOCUMENT_CREATE2 in DEEP entity creation.

And I have implemented CHANGESET BEGIN and CHANGESET ends methods.

As I cannot use Commit statement in the function module, tables data for the document numbers are not getting updated(Classifications)

Example :

let say I have created 3 documents using function module, the only third value is getting updated at the end. First two values are not getting updated because there is no COMMIT statement.

Could you kindly help with this scenario?

Thank you,

Like (1)

Prabaharan Asokan

April 18, 2019 at 10:03 am

Hi Manikandan Rajasekar

Thanks for the detailed sharing. I tried to experiment the same in the hub system which is connected to backend system(CRM). But none of the $batch requests are getting executed in the system and receiving error like 'The server has not found any resource matching the Data Services Request URI'. I have put this question in a new thread https://answers.sap.com/questions/12664759/weird-error-occurred-when-using-batch-request.html Could you please shed some lights there ?

Thanks & Regards

Prabaharan Asokan

Like (0)

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