

## Business Scenario

While using SAP FIORI application, there can be many scenarios when users are experiencing low connectivity or need to have their devices in offline mode. For example, when users are in warehouses and creating business transactions they could experience low internet connectivity and will be able to retrieve only limited amount of data. Another instance could be when field engineers go for inspections to hospitals and cannot use wireless connections due to electrical interference with other medical devices. The engineer could further go on multiple inspections without syncing their device back to the SAP system.

In both cases, delta load functionality will play a key part when syncing data back from the system. When the user is on the field, we need to limit the amount of data being sent back and forth from the system to the device. If we are retrieving a list of business documents or business partners, we should ideally send a small subset of changed data and not the entire data set. This is where delta token functionality plays an integral part.

## Delta Token Load Overview

OData uses collections of records as entity sets. These entity sets support various options such as sorting, filtering or paging to minimize the amount of data that is sent across in each instance call. Paging is a very powerful option to reduce the size of the payload and improves performance while calling operations. To use paging on the client side, the OData request needs to specify the \$skip and \$top tokens for server driven caching.

Some applications, however, prefer to use client-side caching rather than paging. In such cases, SAP NetWeaver Gateway provides Delta Tokens that help to reduce resource consumption on the server side when the same request is sent multiple times from the same client. The OData Delta Token enables clients to use caching when retrieving entity sets. The initial request contains all the records from the entity set along with a delta token. When the subsequent call is made with the delta token sent in the first request, the server will only send the changed records for the entity set. If no records have been changed since the first request, then the response will not contain any records at all.

The following methods need to be redefined in the ODATA class.

- /IWBEP/IF\_MGW\_APPL\_SRV\_RUNTIME~GET\_ENTITYSET
- /IWBEP/IF\_MGW\_APPL\_SRV\_RUNTIME~GET\_ENTITYSET\_DELTA

In the GET\_ENTITYSET method, a hash key for the data container is created or updated for the initial load. All the entities in the entity set are tied to one delta token and are passed back to the response.

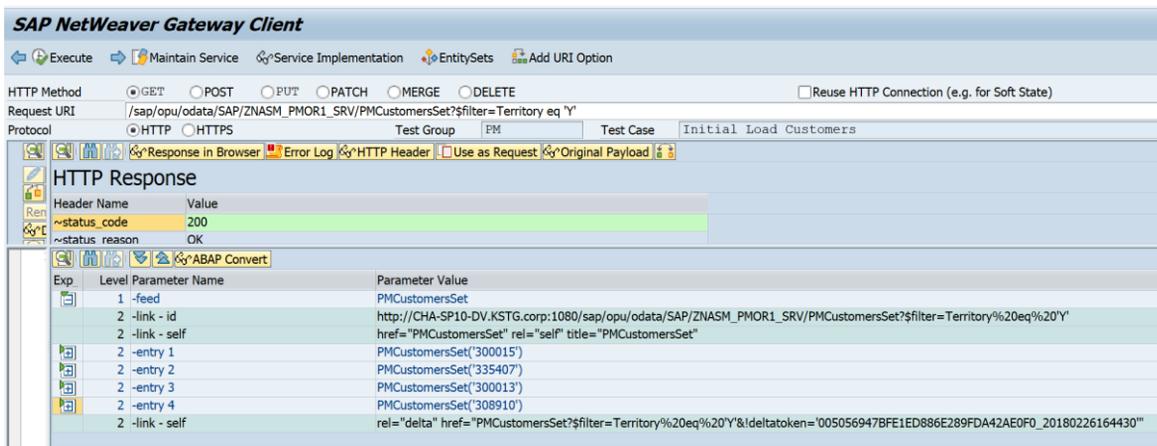
In the GET\_ENTITYSET\_DELTA method, first, retrieve the delta keys for that entity set and then compare the entity list to see the newly created, changed or deleted entries based on the data container attributes. After this, a new delta token is passed to the response.

## Example

Consider receiving a list of customers for a field service application. Since the customer information should not change frequently, we only want the updated information coming in each call in order to maximize performance.

Step 1: Customer Initial Load

```
/sap/opu/odata/SAP/Project/CustomersSet?$filter=( Territory eq 'Y' )
```



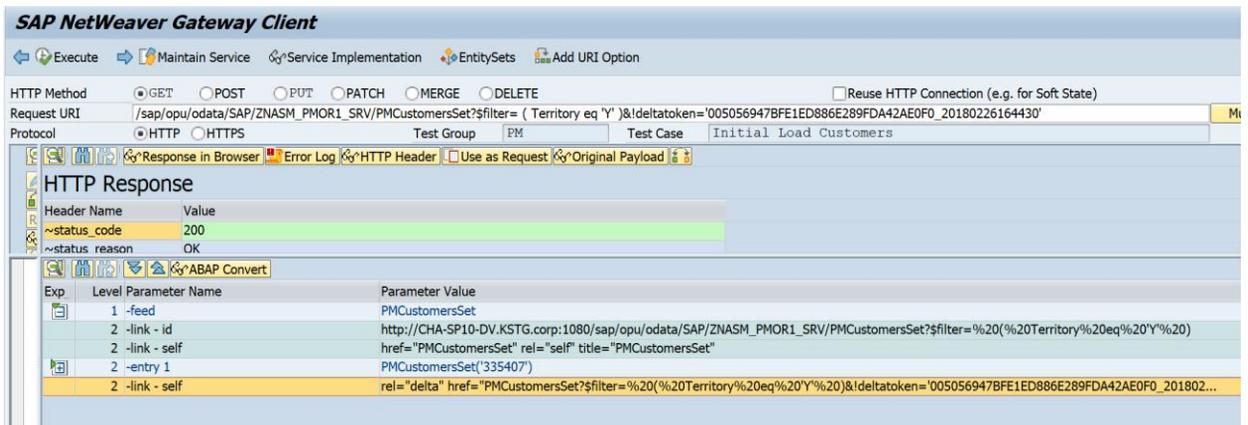
You can see the delta token in the last line.

`deltaToken='005056947BFE1ED886E289FDA42AE0F0_20180226164430'`

Step 2: Now go and change an attribute for one of the partners in SAP. For example, change the address.

Step 3: Request customer load again by-passing delta token from Step 1.

`/sap/opu/odata/SAP/Project/CustomersSet?$filter=(Territory eq 'Y')&!deltaToken='005056947BFE1ED886E289FDA42AE0F0_20180226164430'`



After this when you call the delta query with the delta token, you will see only one customer in the list and a new delta token will be created.

`deltaToken='005056947BFE1ED886E289FDA42AE0F0_20180226165120'`

## Conclusion

As we can see from the example only the changed entity is sent back to the device. This is particularly useful in the case of large data sets where it could take up to minutes to sync the data back to the device. In case of a broken connection, the user will find it difficult to get the updated data back from the system in areas of limited internet connectivity. With the inclusion of delta token in ODATA, the performance of FIORI applications can become load independent.

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