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January 29, 2015 6 minute read

Support of multiple backend systems – How to use Multi Origin Composition and Routing

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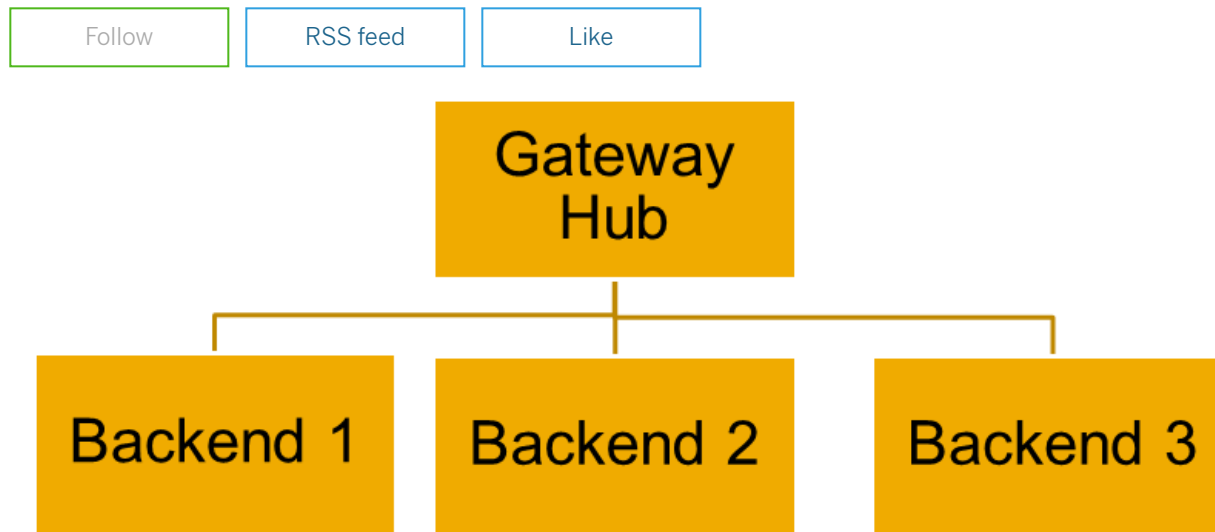
Changes

08.08.2016 – Added link how to implement custom routing

12.06.2017 – Added section about host name based routing

Use case 1 – Multi Origin Composition

A service is configured to use Multi Origin Composition to retrieve data from different backend systems, say Backend_1, Backend_2 and Backend_3.



Therefore corresponding system alias entries have been created in the SAP Gateway Server and have been assigned to the service. This works fine as long as every user that calls this service has also a user in all three backend systems. However if there are users that have do not have users in all connected backend systems the call will fail.

Caution

Since as of SP07 of SAP Gateway 2.0 it is possible to make the READ feed requests of a service in "Multi Destination Composition" mode error tolerant (SPRO -> SAP NetWeaver -> Gateway -> OData Channel -> Composition -> Flag OData Services to be error tolerant in case of MDC) customers have tried to use this feature to solve the issue describe above.

The fault tolerant behaviour should however NOT be used in this case since the intention behind the fault tolerance option is to handle temporary error situations, e.g. a temporary connection problem to the backend where a next call that is performed a little bit later would be successful. The

initial request however is processed by all backends and does not break at the first failing backend.

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The solution that we recommend for the use case mentioned above is to use routing together with multi origin compositino as described in the following:

Solution

In a situation as described above one would like to restrict the SAP Gateway server such that it would only call those backend systems where the user that calls the service also has a user. This can be achieved by combining the features of Multiple Origin Composition and Routing.

Let's assume we have three different user groups A, B and C that have users in the following backend systems





Userid	Backend System 1	Backend System 2	Backend System 3
USER_A (user group A)	X		
USER_B (user group B)	X	X	
USER_C (user group C)	X		

We now add the roles USERGROUP_A, USERGROUP_B and USERGROUP_C to the system aliases BACKEND_1, BACKEND_2 and BACKEND_3 that are assigned to the OData service. Since users from USERGROUP_A and USERGROUP_B have users inBACKEND_1 we have added the system alias BACKEND_1 twice. One time with having added role USERGROUP_A and one time with having added role USERGROUP_B.

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
 Add System Alias	 Remove System Alias	 Customizing	 Service Implementation
--	---	---	--

System Aliases

SAP System Alias	Description	User Role	Default
BACKEND_1	Dummy System Alias to test routing	USERGROUP_A	<input checked="" type="checkbox"/>
BACKEND_1	Dummy System Alias to test routing	USERGROUP_B	<input type="checkbox"/>
BACKEND_2	Dummy System Alias to test routing	USERGROUP_B	<input checked="" type="checkbox"/>
BACKEND_3	Dummy System Alias to test routing	USERGROUP_C	<input checked="" type="checkbox"/>

We can now assign the roles USERGROUP_A, USERGROUP_B and USERGROUP_C to the users USER_A, USER_B and USER_C respectively so that their calls are routed to those system(s) where they have backend users.




















































Display User

63 

User:

Last Changed On: Status:

Address Logon data SNC Defaults Parameters **Roles** Profiles Gr...

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User

USER_B

Last Changed On

USER_B

29.01.2015

15:06:03

Status

Saved

Address

Logon data

SNC

Defaults

Parameters

Roles

Profiles

Gr...

Role

Role

Reference user for additional rights

Role Assignments

S...	Role	Type	Valid From	Valid to	Name
<input checked="" type="checkbox"/>	USERGROUP_B		29.01.2015	31.12.9999	empty role for backend assignment

Display User

User

USER_C

Last Changed On

USER_B

29.01.2015

15:06:34

Status

Saved

Address

Logon data

SNC

Defaults

Parameters

Roles

Profiles

Gr...

Role

Role

Reference user for additional rights

Role Assignments

S...	Role	Type	Valid From	Valid to	Name
<input checked="" type="checkbox"/>	USERGROUP_C		29.01.2015	31.12.9999	empty role for backend assignment

When performing a MOC call like the following using the Gateway Client

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/sap/opu/odata/IWBEP/GWDEMO;mo/CountryCollection/

You would get responses like the following:

USER_A

<entry>

<id>[http://<host>:](#)

<port>/sap/opu/odata/IWBEP/GWDEMO;mo/CountryCollection(**SAP__Origin='BACKEND_1'**,CountryCode='AD')

</id>

<title type="text">CountryCollection(**SAP__Origin='BACKEND_1'**,CountryCode='AD')</title>

<updated>2015-01

...

</entry>

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USER_B

<entry>

<id>[http://<host>](#):

<port>/sap/opu/odata/IWBEP/GWDEMO;mo/CountryCollection(**SAP__Origin='BACKEND_1'**,CountryCode='AD')

</id>

<title type="text">CountryCollection(**SAP__Origin='BACKEND_1'**,CountryCode='AD')</title>

<updated>2015-01

...

</entry>

...

<entry>

<id>[http://<host>](#):

<port>/sap/opu/odata/IWBEP/GWDEMO;mo/CountryCollection(**SAP__Origin='BACKEND_2'**,CountryCode='AD')

</id>

<title type="text">CountryCollection(**SAP__Origin='BACKEND_2'**,CountryCode='AD')</title>

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...

</entry>

USER_C

<entry>

<id>[http://<host>:
<port>/sap/opu/odata/IWBEP/GWDEMO;mo/CountryCollection\(SAP__Origin='BACKEND_3',CountryCode='AD'\)](#)
</id>

<title type="text">CountryCollection(SAP__Origin='BACKEND_3',CountryCode='AD')</title>

<updated>2015-01

...

</entry>

Please note that an additional key field **SAP-Origin** has been added to the response. Therefore it is possible to distinguish results from the different

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Use only routing

If the users have only one user in one of the backend systems you could call the service without the MOC option. In this case the call is simply routed to one backend.

The default flag

When assigning system alias entries to a service there is the option to mark an entry as default which is also described here: [Assigning SAP System Alias to OData Service – SAP NetWeaver Gateway – SAP Library](#).

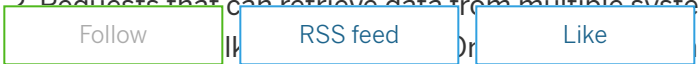
Why do we have this default flag ?

There are basically 3 types of requests:

1. Requests that can only be performed in one system

An example for such a request is the \$metadata request or a create request or a function import that only retrieves one entity (multiplicity 1)

2. Requests that can retrieve data from multiple systems



requests that use the option “;mo”. Examples are requests that retrieve a list from an entity set or a function import with multiplicity n.

3. Requests that will end up in one system

A simple example is any request that is sent without the MOC option.

The default flag is needed to specify a specific system alias to be used if more than one system alias is found but only one is needed. Let’s have a look at the following two examples where this is the case.





1.) Request of an entity set without using the MOC option

In the example described above this would be the case if USER_B performs the http GET request without using the MOC option.

```
/sap/opu/odata/IWBEP/GWDEMO/CountryCollection/
```

In this case the data would be retrieved from BACKEND_2 since based on the role assignment two system aliases are found (BACKEND_1 and BACKEND_2) but only the one with BACKEND_2 is marked as default.

If none of the 2 system alias entries BACKEND_1 and BACKEND_2 are marked as ‘Default’ as shown in the following screen shot:

 Add System Alias	 Remove System Alias	 Customizing	 Service Implementation
System Aliases			
SAP System Alias	Description	User Role	Default
BACKEND_1	Dummy System Alias to test routing	USERGROUP_A	<input checked="" type="checkbox"/>
BACKEND_1	Dummy System Alias to test routing	USERGROUP_B	<input type="checkbox"/>
BACKEND_2	Dummy System Alias to test routing	USERGROUP_B	<input type="checkbox"/>
BACKEND_3	Dummy System Alias to test routing	USERGROUP_C	<input checked="" type="checkbox"/>

than the following error message would occur:

No System Alias flagged as "Default" for Service 'ZGWDEMO_0001' and user 'USER_B'

SAP NetWeaver Gateway Client

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HTTP Method: GET POST PUT PATCH MERGE DELETE ☐ Reuse HTTP Connection (e.g. necessary for Soft State)

Request URI: /sap/opu/odata/IWBEP/GWDEMO/CountryCollection/ Add URI Option

Protocol: HTTP HTTPS Test Group: MOC Test Case: count for moc

HTTP Request

Header Name	Value

1

HTTP Response

Header Name	Value
~status_code	500
~status_reason	Internal Server Error

```
<?xml version="1.0" encoding="UTF-8"?>
- <error xmlns="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata">
  <code>/IWFND/CM_COS/065</code>
  <message xml:lang="en">No System Alias flagged as "Default" for Service
    "ZGWDEMO_0001" and user 'USER_B'</message>
  <innererror>
    <transactionid>EF8FA8E4A0FAF1A4AC4F005056B22F13</transactionid>
    <timestamp>20150130150057.0600000</timestamp>
    <Error_Resolution>
      <SAP_Transaction>Run transaction /IWFND/ERROR_LOG on SAP NW Gateway hub
        system and search for entries with the timestamp above for more
        details</SAP_Transaction>
      <SAP_Note>See SAP Note 1797736 for error analysis
        (https://service.sap.com/sap/support/notes/1797736)</SAP_Note>
    </Error_Resolution>
    <errordetails/>
  </innererror>
</error>
```

2.) Retrieve the \$metadata document of a service

The same error would also occur if USER_B would try to retrieve the \$metadata document of the service

/sap/opu/odata/IWBEP/GWDEMO/\$metadata

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Use case 2 – Use the host name in addition for routing

In this scenario different system aliases should not only be selected based on the roles that have been assigned to a user but also on the host name that is used by the OData client to call the service.

In this case you have to add a host name including the port number in the field *Host Name* when adding a new system alias to a service using the transaction `/n/IWFND/MAINT_SERVICE`.

Please note:

Adding solely the host name without the port number will not work.

System Aliases

SAP System Alias	Description	Default	Metadata	User Role	Host Name
LOCAL	Local System Alias	<input type="checkbox"/>	<input type="checkbox"/>	Z_GATEWAY	gw_on_host1:50006
LOCAL2	Local System Alias	<input type="checkbox"/>	<input type="checkbox"/>	Z_GATEWAY	gw_on_host2:50006

If a user uses the following URL

`http://gw_on_host1:50006/sap/opu/odata/IWBEP/GWSAMPLE_BASIC/ProductSet`

the system alias **LOCAL** will be used whereas when using the following URL

`http://gw_on_host2:50006/sap/opu/odata/IWBEP/GWSAMPLE_BASIC/ProductSet`

the system alias **LOCAL2** will be used.

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If role based routing and the use of host names does not suite your needs you can implement custom dynamic system alias calculation as described in my following blog.

[How to implement custom dynamic system alias calculation in SAP Gateway](#)

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[SAP Gateway](#) | [former jive document](#) |

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By **Syambabu Allu** , Jan 28, 2013

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By **Former Member** , Feb 02, 2015

[Error while consuming Odata service from Gateway client i.e /iwfnd/gw_client](#)

By **Former Member** , Aug 08, 2014

22 Comments

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[Kai Holert](#)

March 3, 2015 at 3:08 pm

If this is not sufficient, SAP provides the enhancement spot **/IWFND/ES_MGW_DEST_FINDER** for the implementation of customer specific rules.

See SAP Help Portal:

http://help.sap.com/saphelp_gateway20sp09/helpdata/en/5b/3391526aa6224fe10000000a445394/content.htm

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July 1, 2015 at 11:39 am

Hello,

We have implemented OData Service using Multiple Origin Composition concept. Where, We had two backend Systems (for ex: SYS1 and SYS2) and a gateway server system (For Ex: GWS). So When we make a call to service, the result comes from both the backend systems into a single feed.

But if one of the backend systems is down, We could not receive the result from the other backend as well. We should receive the result from SYS2 when SYS1 is down. Could you help in this regard.

Note: We have RFC connection from GWS to SYS1 and from GWS to SYS2.

Thank You.

Seshu

Like (0)



[Andre Fischer](#) | Post author

July 1, 2015 at 3:56 pm

Hi Seshu,

as I wrote in the section "Caution" in this document there is a way to achieve a fault tolerant behavior for exactly these kind of scenarios.

Since as of SP07 of SAP Gateway 2.0 it is possible to make the READ feed requests of a service in "Multi Destination Composition" mode error tolerant (SPRO -> SAP NetWeaver -> Gateway -> OData Channel -> Composition -> Flag OData Services to be error tolerant in case of MDC)

Best Regards,

Andre

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Former Member

July 2, 2015 at 8:10 am

Hi Andre,

Yes. We have added our service in 'Flag OData Services to be error tolerant in case of MDC' table in SPRO. Which is able to handle if there is any runtime error in one system (in this case, rfc connection is successful and service call can meet backend system). But, When the whole backend system is down (which results in rfc connection fail) for maintenance, the result is some rfc error but not the result from another backend. Could you please tell me what is the reason.

Thank you for looking into this issue.

Regards,

Seshu

Like (0)



Former Member

March 2, 2016 at 12:58 am

Hi Andre, great blog! With this scenarios, how would you know/specify which system is making the call since they all using the same gateway server?

Thanks

DT

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Oliver Walter

March 24, 2016 at 2:10 pm

Hello everyone,

we face an issue with multiple Aliases assigned to an OData Service, where the aliases are not restricted by user roles:

System_A (Default)

System_B

System_C

System_D

...

In General every user could call every alias and the selection is controlled by SAP-Origin. A request goes only to one particular System.

No it can happen, that a user has Access to Gateway, but is missing sufficient authorization to any of the backends. In that case we return a message, that user is not authorized for backend xxx.

Unfortunately now we have the issue that the Odata call is executed with SAP-Origin=System_D, but the error Returns always the Default Alias System_A.

Switching off the Default Alias is also not working.

Any idea to solve this issue?

Regards Oliver

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Rahul Gupta

March 24, 2016 at 4:51 pm

Oliver,

Clear cache /IWFND/CACHE_CLEANUP t-code and then try.

~Rahul

Like (0)



Oliver Walter

March 29, 2016 at 6:52 am

Hi Rahul,

thanks for the hint, but this does not solve the issue. Any ideas?

Regards Oliver

Like (0)



Former Member

November 10, 2016 at 6:16 pm

Hi Andre

Please, which the content of the role? The authorization objects?

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Beat Birrer

September 3, 2018 at 12:34 pm

Hello everyone,

I have a generated oData-Service based on a CDS-View. I try the multi origin composition to get data from two different clients. This works basically but when I add a filter to the request to get the data from a specific client, i'll always get an error. There are no issues when I do the same with a manually created oData-Service. So I think there is a problem with the SADL based services.

This is the request

SAP Gateway Client

Execute Select Service Administration Service Implementation EntitySets

HTTP Method

☒ GET ☐ POST ☐ PUT ☐ PATCH ☐ MERGE ☐ DELETE

Request URI

/sap/opu/odata/sap/ZVO_1STAT_CDS_SRV;mo/ZVO_CDS_STAT_REPO_UI?\$filter=SAP__Origin eq '██████████'

Protocol

☒ HTTP ☐ HTTPS

Test Group

Test Case

And this the response:

HTTP Response - Processing Time = 3919 ms

Header Name	Value
~status_code	500
~status_reason	Internal Server Error

Follow	RSS feed	Like	t=utf-8
~server_protocol	HTTP/1.0		
set-cookie	sap-usercontext=sap-language=E&sap-client=101; path=/		
set-cookie	SAP_SESSIONID_MT3_101=Wc_uIK1zYqwkMvHZcDbq_8lrFWivdBHootoAUFaOb14%3d; path=/; ...		
content-length	904		
dataserviceversion	1.0		
sap-perf-fesrec	3873565.000000		
RequestID	0050568E6F5E1EE8ABEE9933B2E6E2DA		

```

<?xml version="1.0" encoding="UTF-8"?>
- <error xmlns="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata">
  <code>/IWFND/CM_BEC/026</code>
  <message xml:lang="en">RFC Error: This line is not contained in the table.</message>
  - <innererror>
    - <application>
      <component_id>FI-CAX</component_id>
      <service_namespace>/SAP/</service_namespace>
      <service_id>ZVO_1STAT_CDS_SRV</service_id>
      <service_version>0001</service_version>
    </application>
    <transactionid>E1744373AE6900B0E005B7FFD5119EFC</transactionid>
    <timestamp>20180903122809.5630380</timestamp>
    - <Error_Resolution>
      <SAP_Transaction>Run transaction /IWFND/ERROR_LOG on SAP Gateway hub sys
        details</SAP_Transaction>
      <SAP_Note>See SAP Note 1797736 for error analysis (https://service.sap.com/s
    </Error_Resolution>
    <errordetails/>
  </innererror>
</error>

```



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Can anyone help me?

Like (0)



Andre Fischer | Post author

September 3, 2018 at 2:22 pm

Hi Beate,

I tested this myself and found the same issue.

I raised an SAP internal incident for that.

Can you please create a question in the forum that I can answer once I get Feedback from my colleagues.

I don't see a workaround right now since the SADL runtime used the **io_tech_request_context** object.

In contrast to the mapped data source approach there is no option to manipulate the filter string.

Regards,

Andre

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Beat Birrer

September 4, 2018 at 7:24 am

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thanks for your answer and for creating an internal incident.

I create the following question in the forum where you can answer if you get some news.

<https://answers.sap.com/questions/621502/odata-multi-origin-doesnt-work-with-sadl-runtime.html>

Thanks and regards,

Beat

Like (0)



Ginwene Rueda

September 7, 2018 at 6:38 am

Hi,

Does this work for batch operation?

We have a similar setup, but it only works if the requests are on a non-batch request.

Thanks,

Gin

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Marc Schleeweiß

April 11, 2019 at 1:33 pm

Hello,

how can we implement this behaviour when using SAP Cloud Platform OData Provisioning?

Like (0)



Andre Fischer | Post author

April 12, 2019 at 3:29 pm

Hi Marc,

SAP Cloud Platform OData Provisioning does not support routing.

It only supports multi origin composition (MOC).

So you can't implement this behavior using SAP CP ODP.

Regards,

Andre

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Marc Schleeweiß

April 15, 2019 at 9:25 am

Thank you for your response. This seems like a showstopper for us, since we are currently migrating from on-premise to the cloud. Is this on the roadmap? Is there a workaround?

Like (0)



Andre Fischer | Post author

April 19, 2019 at 12:18 pm

Hi Marc,

I checked with my colleagues and they told me that it is on the roadmap but I can unfortunately not share any Details, especially not when this feature is planned to be delivered.

Depending on the complexity you might be able to use several sub accounts that are connected to different backend Systems?

Best Regards,
Andre

Like (0)



KIRAN POSANAPALLI

April 29, 2019 at 8:29 pm

Hi Andre ,

I have a scenario where I need to build an ODATA Service in SAP CRM system to SFDC to consume. This ODATA service, in turn, has to communicate with S4 system to pull some of the data. This ODATA service and RFC to S4 system to pull some of the data. For this scenario, what is the recommended approach?

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Regards

Kiran

Like (0)



Andre Fischer | Post author

May 4, 2019 at 5:02 pm

It depends on the SAP NetWeaver Release in your SAP CRM system and the timeframe in which the new service has to be built.

1.

The new SAP Cloud ABAP Environment might be an option for you since the new ABAP RESTful programming model allows for both, the consumption of OData Services as well as the consumption of RFC function modules and is perfectly suited for an ABAP based extension for SAP on premises systems as well as for SAP S/4 HANA Cloud.

There are still some technical restrictions that one would have to look into whether they are a showstopper right now.

2.

The second option would be to build an OData Service in the CRM using the SAP Gateway Framework using SEGW.

Here one would have to look how calling an OData service in C4S can be implemented since the OData Proxy will not yet be part of your SAP Gateway framework functionality.

HTTP calls can be performed but you would have to parse the OData response on your own.

Regards

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Andre

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Olga Chrebtov

June 26, 2019 at 11:13 am

Hello Andre,

Thank you very much for your Article!

We can connect one Gateway(Hub) with one Mandant with multiple Mandant in S/4 HANA On-Premise?

Several Apps use Standard System Alias (Example S4FIN). How connect we in this Case?

Best Regards

Olga

Like (0)



Andre Fischer | Post author

June 26, 2019 at 11:24 am

Yes , you can define several system aliases (S4FIN1, S4FIN2, ...) that will use RFC destinations that point to Client 001, 002, ...

So you simply have to define additional system aliases for all clients in your S4 Backend and assign those to your services using transactin

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Olga Chrebtov

June 27, 2019 at 11:48 am

Hello Andre,

We have clients 100, 200, 300 in S/4 HANA. In Gateway Hub (Fiori) have we only one client 100. If I understood correctly, for each Client should we do System Alias FI100, FI200, FI300 with Role ZGW_100, ZGW_200, ZGW_300 and assign to OData Service. Should we assign System Alias in each Tile by Parameter Field in Fiori Launchpad Designer? What else should we do? How do we set SAP GUI, WEB Dynpro in this Case to Fiori Launchpad? Is there documentation?

Best Regards

Like (0)

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