

1 Goal of this tutorial

The table ZTT_EMPLOYEE_### should be accessible as RESTful OData web service and provide CRUD functionality

2 Overview of transactions

Transaction	Function
SEGW	Create/Model OData Web Services in Service Gateway Builder
SE80	Redefine and implement Class Methods
/IWFND/MAINT_SERVICE	Activate and Maintain Service
/IWFND/GW_CLIENT	Test Service – also accessible from Service Maintenance
/IWFND/ERROR_LOG	Check error log (on error) – also accessible from Gateway Client

3 Table ZTT_EMPLOYEE_###

Data Browser: Tabelle ZTT_EMPLOYEE_MSC 8 Treffer

Tabelle: ZTT_EMPLOYEE_MSC
Angezeigte Felder: 9 von 9 Feststehende Führungsspalten: 3 Listbreite 0250

	CLIENT	CARRIER	ID_EMPLOYEE	FIRSTNAME	LASTNAME	DEPARTMENT	AREA	SALARY	CURRENCY
<input type="checkbox"/>	200	AA	0000000001	testli	TESTINGER	TST	A	4 000,00	EUR
<input type="checkbox"/>	200						F	1 000,00	CHF
<input type="checkbox"/>	200	AB	0000000020	chlous	MAIER	RESV	F	3 000,00	EUR
<input type="checkbox"/>	200	LH	0000000030	maxim	NOWAK	RESV	S	4 500,00	EUR
<input type="checkbox"/>	200	SR	0000000002	rainer	FUX	MARK	A	5 200,00	CHF
<input type="checkbox"/>	200	SR	0000000021	fabi	ZENKLUSEN	MARK	F	4 500,00	CHF
<input type="checkbox"/>	200	SR	0000000022	damian	ZENKLUSEN	MARK	F	4 800,00	CHF

Create/Change record 0000000001 that contains your firstname, lastname and department TST. This record will be used to identify your results.

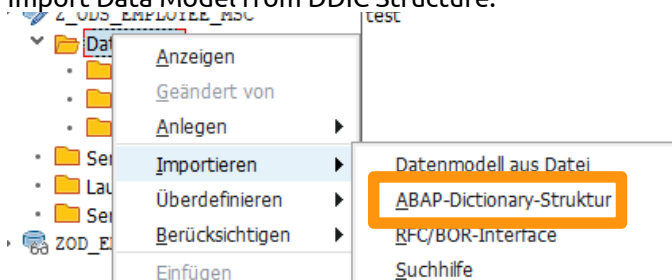
4 Create Service (Transaction SEGW)

Name: Z_ODS_EMPLOYEE_###

Package: ZP_2018_###

4.1 Create Entity Model

Import Data Model from DDIC Structure:



Name of entity: employee_###

Table: ztt_employee_###

Fields: all except client

Key-Fields: carrier, id_employee

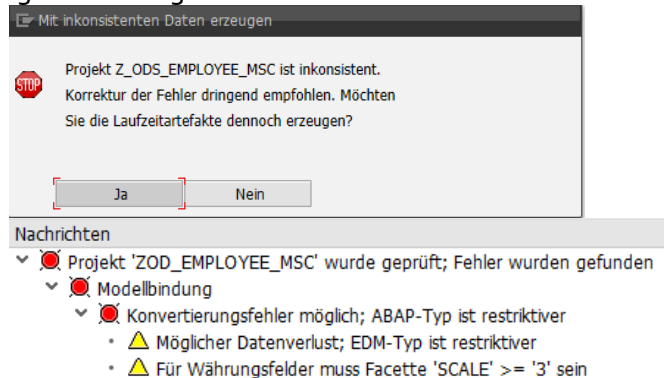
4.2 Create EntitySet Model

Done automatically

4.3 Generate Runtime Artefacts

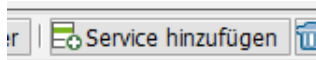


Ignore message:



5 Register/add & Activate Service (Transaction /IWFND/MAINT_SERVICE)

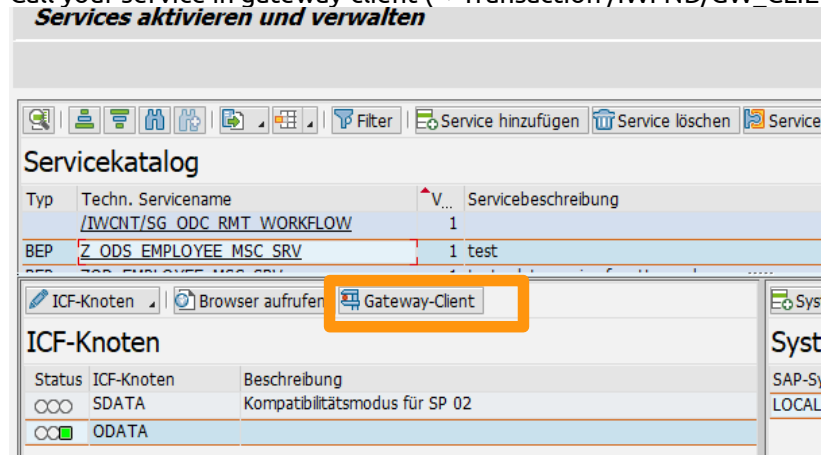
Add service:

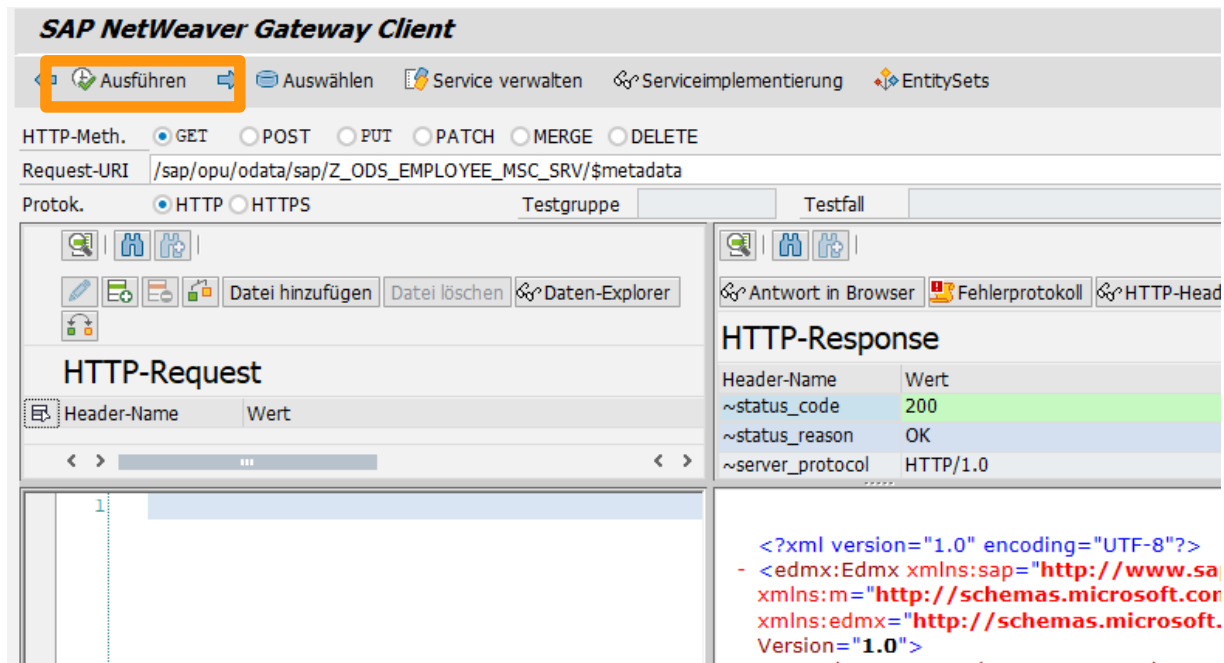


Systemalias: LOCAL

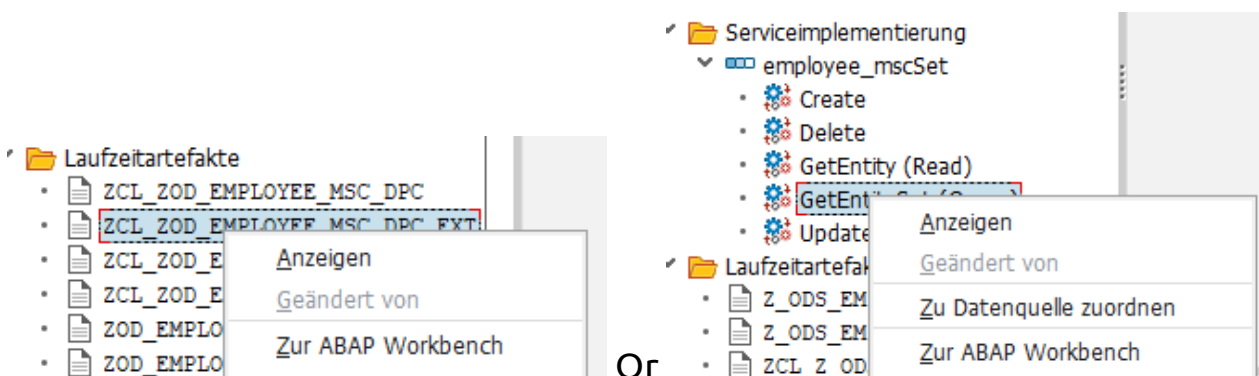
Choose your service and add, confirm all pop-up

Call your service in gateway-client (→ Transaction /IWFND/GW_CLIENT) to check





6 Implement Runtime Methods (Transaction SEGW)



Choose `zcl_z_ods_employee_###_dpc_ext` and "go to ABAP workbench" → you will see the class builder with all the methods for your entity.

ABAP OData Service - Create, Read, Update, Delete, Query and Function Import operations

Redefine the following CRUD methods (EMPLOYEE_###SET_*)

Klasse/Interface		ZCL_Z_ODS_EMPLOYEE_MSC_DPC_EXT		realisiert / Inaktiv	
Eigenschaften	Interfaces	Friends	Attribute	Methoden	Ereignisse
Typen	Alasse				
Parameter	Ausnahme				
Methode		Art	Sichtbark...	M...	Beschreibung
EMPLOYEE_MSCSET_CREATE_ENTITY		Instanc...	Protected		Zug. EntitätsmengName: employee_mscSet
EMPLOYEE_MSCSET_DELETE_ENTITY		Instanc...	Protected		Zug. EntitätsmengName: employee_mscSet
EMPLOYEE_MSCSET_GET_ENTITY		Instanc...	Protected		Zug. EntitätsmengName: employee_mscSet
EMPLOYEE_MSCSET_GET_ENTITYSET		Instanc...	Protected		Zug. EntitätsmengName: employee_mscSet
EMPLOYEE_MSCSET_UPDATE_ENTITY		Instanc...	Protected		Zug. EntitätsmengName: employee_mscSet

Fill in the missing code . . . and replace ### by your id – you can use all materials (<http://ccsapedu.hevs.ch>), internet, work in teams of two, but you have to create your own results.

Collect the artefacts of your result as requested below in a result document

SAPABAP_01 <name> <vorname>.docx [Total: 37P].

6.1 EMPLOYEE_###_GET_ENTITYSET

```
data: lt_employee type table of ztt_employee_###,
      ls_employee like line of lt_employee,
      ls_entity   like line of et_entityset,
      ls_orderopt like line of it_order,
      lv_order    type string.

* read data from ztt_employee_### into lt_employee
  Select ...

* read data with one filter: property and select_options in iv_filter_string

* sort lt_employee depending on ls_orderopt-order (asc or desc) and by
  ls_orderopt-property

* fill et_entityset
  loop at lt_em... into ls_em... .
    move-corresponding ls_em... to ls_en... .
    append ls_entity to et_entityset.
  endloop.

* RAISE EXCEPTION TYPE /iwbep/cx_mgw_not_impl_exc
* EXPORTING
*   textid = /iwbep/cx_mgw_not_impl_exc=>method_not_implemented
*   method = 'ZTT_EMPLOYEE_MSC_GET_ENTITYSET'.
Endmethod.
```

Check in gateway client: /sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set

Place the Request-URI and a screenshot of the Gateway Client after execution into the result document [9P]

Extend select for filtering with ...where (iv_filter_string), if iv_filter_string is set.

Check in gateway client: /sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set?

\$filter=Carrier eq 'SR'

Place the Request-URI and a screenshot of the Gateway Client after execution into the result document [3P]

ABAP OData Service - Create, Read, Update, Delete, Query and Function Import operations

Extend the code to **sort** the internal table `lt_employee`, **if** `it_order` is set.
`it_order` contains rows of `ls_orderopt` to loop through.
`ls_orderopt` contains 'asc' or 'desc'.

```
if it_order is ... .  
  loop at it_order into ... .  
    Case ... .  
      when 'asc'.  
        Sort ... by (ls_orderopt-property) ... .  
      ...  
    ...  
  endcase.  
endloop.  
Endif.
```

Check in gateway client: `/sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set?$orderby=Carrier desc`

Place the Request-URI and a screenshot of the Gateway Client after execution into the result document [7P]

6.2 EMPLOYEE_###_GET_ENTITY

```

data: ls_key_tab      type /iwbep/s_mgw_name_value_pair,
      lv_employeeid type ztt_employee_###-id_employee,
      lv_carrier      type ztt_employee_###-carrier,
      ls_employee     type ztt_employee_###.

* get the input parameters from it_key_tab: key-name and value
read table it_key_tab with key name = 'IdEmployee' into ls_key_tab.
lv_employeeid = ls_key_tab-value.

read table it_key_tab with key name = 'Carrier' into ls_key_tab.
lv_carrier = ls_key_tab-value.

* read one record
select ... * from ztt_employee_### into ls_employee where ... =
lv_employeeid and ... = ... .

* fill er_entity
if sy-subrc = 0.
  move... ls_employee to er_entity.
else.
* Raise Exception
  raise exception type /iwbep/cx_mgw_busi_exception
  exporting
    textid = /iwbep/cx_mgw_busi_exception=>resource_not_found.
endif.

```

Check in gateway client:

/sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set(IdEmployee='1',Carrier='AA')

Place the Request-URI and a screenshot of the Gateway Client after execution into the result document [5P]

6.3 EMPLOYEE_###_CREATE_ENTITY

```
data: ls_request_input_data type zcl_z_ods_employee_###_mpc=>ts_employee_###,
      ls_employee          type ztt_employee_###.

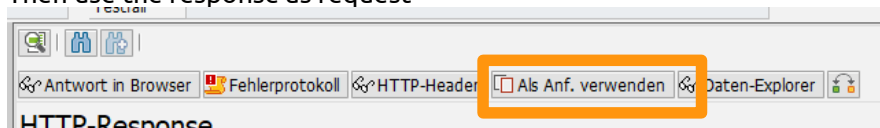
* read request data
  io_data_provider->read_entry_data( importing es_data = ls_request_input_data
).
  move-corresponding ls_request_input_data to ls_employee.

* insert into table
  insert ztt_employee_### from ... .
  if sy-subrc = 0.
    er_entity = ls_request_input_data.
  Endif.
```

Check in gateway client:

First read one record (see last section),

Then use the response as request



Modify the request:

```
<?xml version="1.0" encoding="utf-8"?>
<entry
xml:base="http://vlhsapg12.hevs.ch:8012/sap/opu/odata/sap/Z_ODS_EMPLOYEE_MSC_###/"
xmlns="http://www.w3.org/2005/Atom"
xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata"
xmlns:d="http://schemas.microsoft.com/ado/2007/08/dataservices">
  <category term="Z_ODS_EMPLOYEE_MSC_SRV.EMPLOYEE_###"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme"/>
  <content type="application/xml">
    <m:properties>
      <d:IdEmployee>000000010</d:IdEmployee>
      <d:Carrier>AA</d:Carrier>
      <d:Firstname>testfirst</d:Firstname>
      <d:Lastname>testlast</d:Lastname>
      <d:Department>TST</d:Department>
      <d:Area>A</d:Area>
      <d:Salary>4000.00</d:Salary>
      <d:Currency>EUR</d:Currency>
    </m:properties>
  </content>
</entry>
```

Send (**POST**) the data to /sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set

Check in the database table ZTT_EMPLOYEE_### (Transaction SE16)

Place the Request-URI and a screenshot of the Gateway Client after execution and a screenshot of the table-content into the result document[2P]

6.4 EMPLOYEE_###_UPDATE_ENTITY

```

DATA: ls_request_input_data TYPE zcl_z_ods_employee_###_mpc=>ts_employee_###,
      ls_key_tab            TYPE /iwbep/s_mgw_name_value_pair,
      lv_employeeid        TYPE ztt_employee_###-id_employee,
      ls_employee          TYPE ztt_employee_###.

* get key values
  READ TABLE it_key_tab WITH KEY name = 'IdEmployee' INTO ls_key_tab.
  lv_employeeid = ls_key_tab-value.

  IF lv_employeeid IS NOT INITIAL.
* read request data
    io_data_provider->read_entry_data( IMPORTING es_data =
ls_request_input_data ).

* update db-table
  UPDATE ztt_employee_### ...
    area = ls_request_input_data-area
    department = ls_request_input_data-department
    firstname = ls_request_input_data-firstname
    lastname = ls_request_input_data-lastname
    salary = ls_request_input_data-salary
    currency = ls_request_input_data-currency
  WHERE
    id_employee = lv_employeeid.

  IF sy-subrc = 0.
    er_entity = ls_request_input_data.
  ENDIF.
ENDIF.

```

Check in gateway client:

First read one record (see last section),

Then use the response as request

Modify the request:

```

<?xml version="1.0" encoding="utf-8"?>
<entry
xml:base="http://vlhsapg12.hevs.ch:8012/sap/opu/odata/sap/Z_ODS_EMPLOYEE_MSC_###
/" xmlns="http://www.w3.org/2005/Atom"
xmlns:m="http://schemas.microsoft.com/ado/2007/08/dataservices/metadata"
xmlns:d="http://schemas.microsoft.com/ado/2007/08/dataservices">
  <category term="Z_ODS_EMPLOYEE_MSC_SRV.EMPLOYEE_###"
scheme="http://schemas.microsoft.com/ado/2007/08/dataservices/scheme"/>
  <content type="application/xml">
    <m:properties>
      <d:Firstname>testfirstupdate</d:Firstname>
      <d:Lastname>testlastupdate</d:Lastname>
      <d:Department>TSTU</d:Department>
      <d:Area>A</d:Area>
      <d:Salary>4000.00</d:Salary>
      <d:Currency>EUR</d:Currency>
    </m:properties>
  </content>
</entry>

```

Send (PUT) the data

to/sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set(IdEmployee='10',Carrier='AA')

Check in the database table ZTT_EMPLOYEE_### (Transaction SE16)

Place the Request-URI and a screenshot of the Gateway Client after execution and a screenshot of the table-content into the result document [2P]

6.5 EMPLOYEE_###_DELETE_ENTITY

```
DATA: ls_key_tab      TYPE /iwbep/s_mgw_name_value_pair,  
      lv_employeeid TYPE ztt_employee_###-id_employee,  
      lv_carrier     TYPE ztt_employee_###-carrier.  
  
* read key values  
  READ TABLE it_key_tab INTO ls_key_tab WITH KEY name = 'IdEmployee'.  
  lv_employeeid = ls_key_tab-value.  
  
  IF lv_employeeid IS NOT INITIAL.  
* delete record  
    DELETE ... WHERE id_employee = lv_employeeid and carrier = lv_carrier.  
  ENDIF.
```

Check in gateway client:

Send (**DELETE**) the data

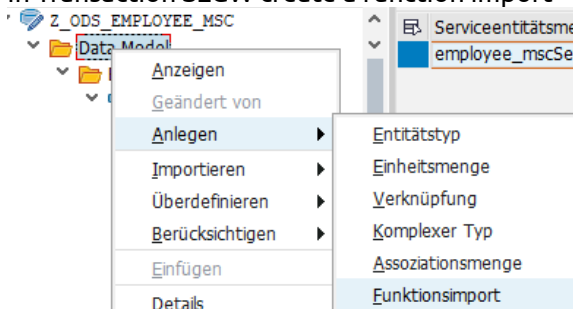
to /sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/employee_###Set(IdEmployee='10',Carrier='AA')

Check in the database table ZTT_EMPLOYEE_### (Transaction SE16)

Place the Request-URI and a screenshot of the Gateway Client after execution and a screenshot of the table-content into the result document [2P]

6.6 Function import to overwrite monthly salary by daily salary using a function module

In Transaction SEGW create a function import



Name: EmployeesSalaryPerDay

Configure:

Name	Rückgabeart	Rückgabeart	Rückgabekardin.	Rückgabeentit.me.	HTTP	Aktion für Entit...	Bezeich
EmployeesSalaryPerDay	Entitätstyp	employee_msc	0..n	employee_mscSet	GET		

Add an import parameter-value

Name	UDM-Kerntyp	Datenelement	Gen...	Skali...	Max...	Semantik	Einheitsreferenzpa...	Bezeichner	B...
DaysPerMonth	Edm.Decimal		0	0	0				T

Name: DaysPerMonth

Add the following code to the redefined method

/IWBEF/IF_MGW_APPL_SRV_RUNTIME~EXECUTE_ACTION

```

DATA: ls_parameter      TYPE /iwbep/s_mgw_name_value_pair,
      lv_dayspermonth   TYPE zde_int10_decimal2,
      lv_salary         TYPE zde_int10_decimal2,
      lt_employee       TYPE TABLE OF ztt_employee_###,
      ls_employee       LIKE LINE OF lt_employee,
      ls_entity         TYPE zcl_z_ods_employee_###_mpc=>ts_employee_###,
      lt_entityset      TYPE zcl_z_ods_employee_###_mpc=>tt_employee_###.

* check for required action
IF iv_action_name = 'EmployeesSalaryPerDay'.
  IF it_parameter IS NOT INITIAL.

* read function import parameter
    READ TABLE it_parameter INTO ls_parameter WITH KEY name =
'DaysPerMonth'.
    IF sy-subrc = 0.
      lv_dayspermonth = ls_parameter-value.
    ENDIF.
    IF lv_dayspermonth IS NOT INITIAL.

* read data
      SELECT * FROM ztt_employee_### INTO TABLE lt_employee.
      LOOP AT lt_employee INTO ls_employee.
        MOVE-CORRESPONDING ls_employee TO ls_entity.
        lv_salary = ls_entity-salary.

* calculate salary per day using function module ZFM_2018_###_00 (pass salary
per month and days per month, receive salary per day)
        CALL ...

        IF sy-subrc <> 0.

* Implement suitable error handling here

```

ABAP OData Service - Create, Read, Update, Delete, Query and Function Import operations

```
ENDIF.
ls_entity-salary = lv_salary.

APPEND ls_entity TO lt_entityset.
ENDLOOP.

* export data
copy_data_to_ref( EXPORTING is_data = lt_entityset CHANGING cr_data =
er_data ).

ENDIF.
ENDIF.
ENDIF.
ENDMETHOD.
```

Change the types in the included function module ZFM_2018_###_00 to ZDE_INT10_DECIMAL2

```
function zfm_2018_msc_00.
* "-----
* " "Lokale Schnittstelle:
* " IMPORTING
* " VALUE(IV_NUMBER01) TYPE ZDE_INT10_DECIMAL2
* " VALUE(IV_NUMBER02) TYPE ZDE_INT10_DECIMAL2
* " EXPORTING
* " VALUE(EV_RESULT) TYPE ZDE_INT10_DECIMAL2
* " EXCEPTIONS
* " EX_DIVISION_BY_ZERO
* "-----
if ( ( iv_number01 is not initial ) or ( iv_number02 is not initial ) ).
if ( iv_number02 eq 0 ).
raise ex_division_by_zero.
else.
ev_result = iv_number01 / iv_number02.
endif.
endif.

Endfunction.
```

Check in gateway client:

Request (GET) to /sap/opu/odata/sap/Z_ODS_EMPLOYEE_###_SRV/EmployeesSalaryPerDay?
DaysPerMonth=22

Place the Request-URI and a screenshot of the Gateway Client after execution and a screenshot of the table-content into the result document [4P]

Place a screenshot of the service project with open nodes (Transaction SEGW) into the result document (similar to the following) [3P]

