S3 for SAP – AWS S3 SDK for ABAP. Community edition

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REVISIONS

Document version	Author	Date
V1.0	**Jordi Escoda**	**Sept 30th 2016**

What is AWS S3 SDK for ABAP

AWS S3 for ABAP is an ABAP AddOn developed under namepace /RS3/.

It enables native integration from ABAP to AWS S3. You will be able to manage buckets, folders and files on AWS S3.

It has two editions: Community and Commercial.

The community edition is the ABAP SDK which you can use as a tool to write your own programs to read from AWS S3 and write to AWS S3. Demo programs are provided as a reference.

The Commercial edition (complete solution) maps from ArchiveLink to AWS S3. In this way you can use S3 as a Content Server. As well you can make use of the ABAP SDK to develop your own programs.

To learn about AWS S3, read: https://aws.amazon.com/s3/

Use cases

- Replace your Content Server by S3 for SAP.
- Store attachments in S3 for SAP
- Store Business Documents in S3 for SAP
- Store archiving sessions in S3 for SAP
- Integration with AWS services which use S3 as input or output, for example: Big Data, Machine Learning, etc…
- Develop custom programs (Z) that integrate with AWS S3 and leverage AWS advantages.

Benefits

Using S3 for SAP gives you these benefits:

- **Simplicity.** AddOn which can be installed in any SAP system, without the need of additional servers. Only depends on BASIS package.
- **Quickly available.** You install and run S3 for SAP in just one hour.
- **No practical storage limits.** You don't need to take care about space limitations.
- **Pay as you go**, pricing is based on the actual storage you use. No need to invest money in any infrastructure.
- **Cloud Compliance.** Your data will be safe in S3. Take advantage of AWS Compliance, meeting plenty of standards, regulations and best practises. Read http://aws.amazon.com/compliance/ for further information.
- **Data persistence** is guaranteed 99.999999999%.
- **Data availability** is guaranteed 99.99%
- **Reduce your IT infrastructure.** Forget about content servers and related costs (purchase, licenses, maintenance, backups, power consumption, cooling, etc…)

- **Testing.** Test easily your archiving projects using development or quality systems. You don't need to ask for any storage server.
- **Seamlessly use.** You don't need to acquire additional knowledge, you will be able use the standard archiving tools (SARA) and GOS in the same way you are used to.

With AWS S3 SDK for ABAP community edition you can:

- Manage your Buckets
- Choose the region where your buckets are stored. This is convenient to meet country regulations
- Write your own programs to read from AWS S3 and write to AWS S3.
- Leverage other AWS services from S3.

With the Commercial solution, in addition you can:

- Easily manage your archiving objects
- Store archiving sessions in AWS S3
- Store business documents in AWS S3
- Retrieve your archiving sessions from AWS S3
- Retrieve your business documents from AWS S3
- On-the-fly encrypting / decrypting with your own SSL certificate
- On-the-fly compression and decompression
- Storage encrypted on server side
- Automatically move to AWS Glacier your data after the period of time to further save costs
- Migrate your stored data to AWS S3
- Migrate back your data to your servers. Your data is own by you and you will always be free to migrate back your data to your servers.

The Commercial solution offers support in any incident which may arise and in case of upgrades and support packages installation. Therefore is the most adequate for productive environments, where the companies require a support of business level.

Prerequisites

To run AWS S3 SDK for ABAP Community edition in your SAP system, following prerequisites should be met.

- An AWS account + Privileges to create IAM users
- SAP Netweaver 7.0 or higher
- SAP Kernel release 720 or higher
- SAP Cryptolib properly installed
- ICM Services HTTP and HTTPS configured and active
- Connectivity to the AWS endpoints (either directly or through a Proxy properly configured).
- OpenSSL installed on the OS (Linux or Windows)

- To install the add-on, a user with enough privileges (please read Authorization)

The service of installing and configuring is included in the Commercial edition.

Installation

Actions to do in AWS Console

Create an IAM user with following privileges.

For Bucket operations:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:*"
            ],
            "Resource": [
                "arn:aws:s3:::<sid>-*"
            ]
        }
    ]
}
```

Where <sid> is the SID of your SAP system, **in lowercase.**

You can download this json file from
https://github.com/LinkeIT/AWS_S3_SDK_for_ABAP/blob/master/Bucket_Policy.json

For IAM GetUser:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "iam:GetUser"
      ],
      "Resource": [
        "arn:aws:iam::<aws_account_id>:user/<iam_user>"
      ]
    }
  ]
}
```

Where <aws_account_id> is your AWS account ID and <iam_user> is your iam user

You can download this json file from
https://github.com/LinkeIT/AWS_S3_SDK_for_ABAP/blob/master/IAM_Policy.json

For Listing Buckets:

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:ListAllMyBuckets"
            ],
            "Resource": [
                "arn:aws:s3:::*"
            ]
        }
    ]
}
```

You can download this json file from https://github.com/LinkeIT/AWS_S3_SDK_for_ABAP/blob/master/S3_Policy.json

Example: If SID is `DES`, AWS account is `997663152801` and user is `S3_user` the resulting policy should be:

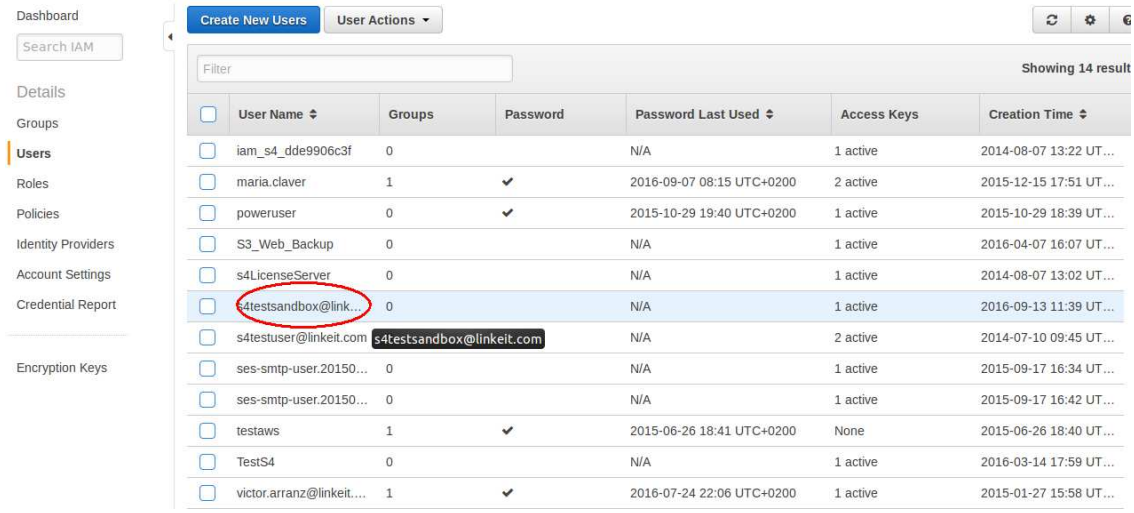
```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:*"
            ],
            "Resource": [
                "arn:aws:s3:::des-*"
            ]
        }
    ]
}

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "iam:GetUser"
      ],
      "Resource": [
        "arn:aws:iam::997663152801:user/s3_user"
      ]
    }
  ]
}

{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:ListAllMyBuckets"
            ],
            "Resource": [
                "arn:aws:s3:::*"
            ]
        }
    ]
}
```

To learn more about Bucket Policies, read
http://docs.aws.amazon.com/AmazonS3/latest/dev/using-iam-policies.html

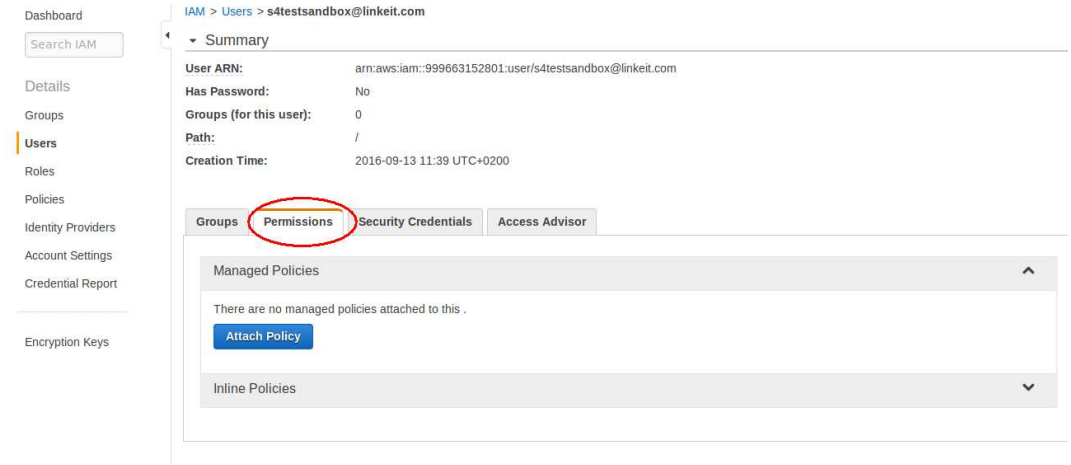
To learn more about IAM Policies, read
http://docs.aws.amazon.com/IAM/latest/UserGuide/access_policies.html

Screenshots

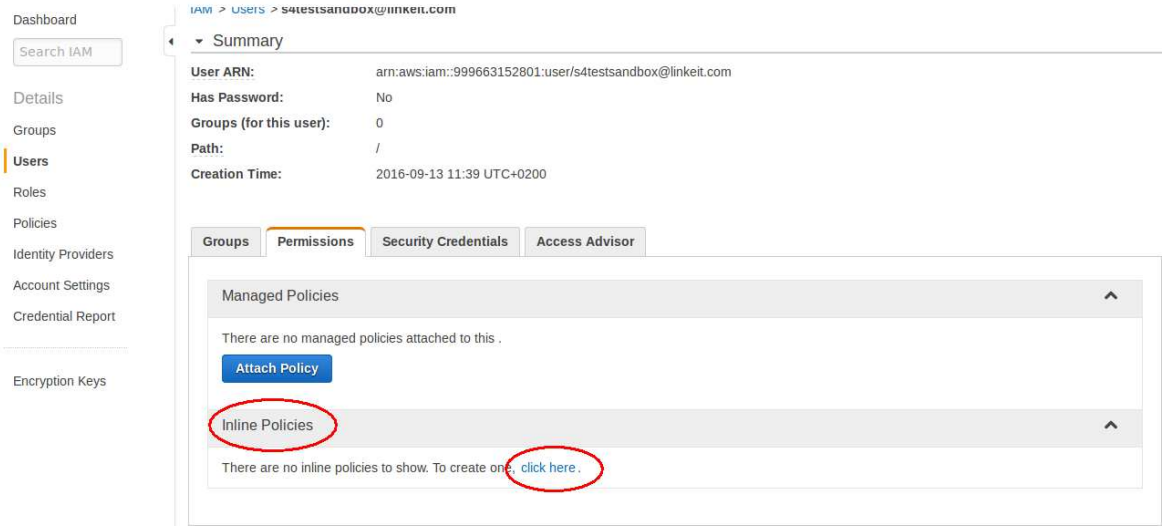
To attach the policy follow these steps:
On AWS console go to IAM.
Click on the user

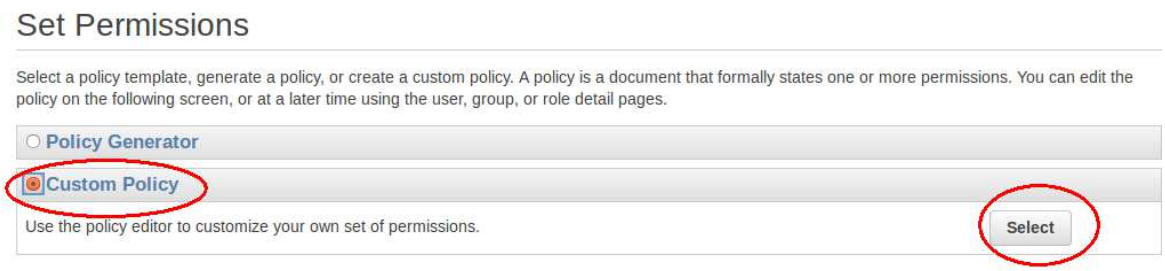


Permissions

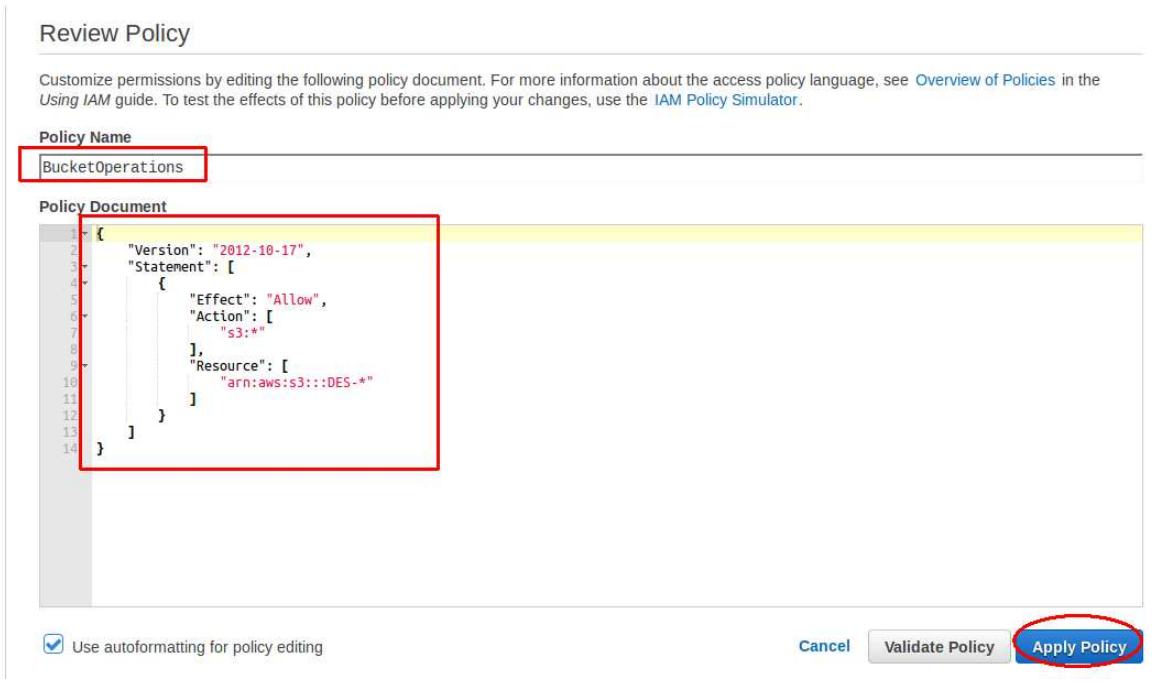


Inline policies…



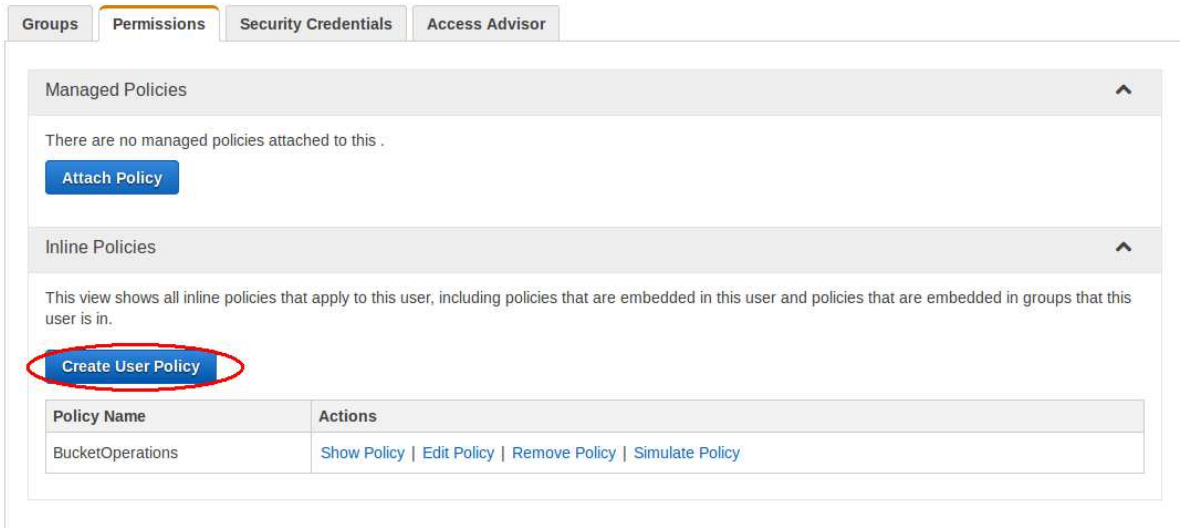


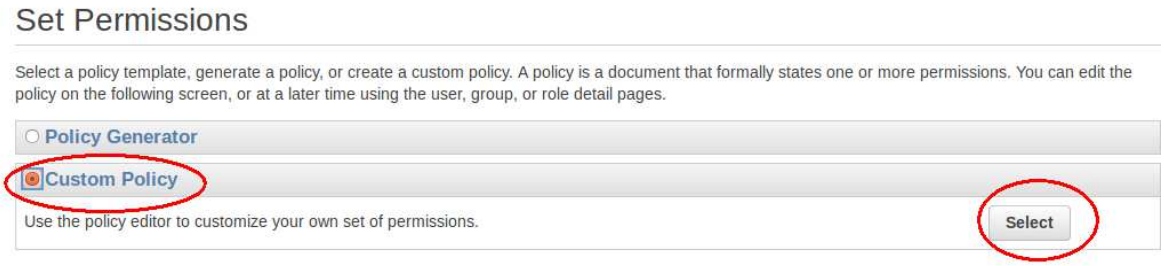
Policy name, and paste the policy. Apply Policy



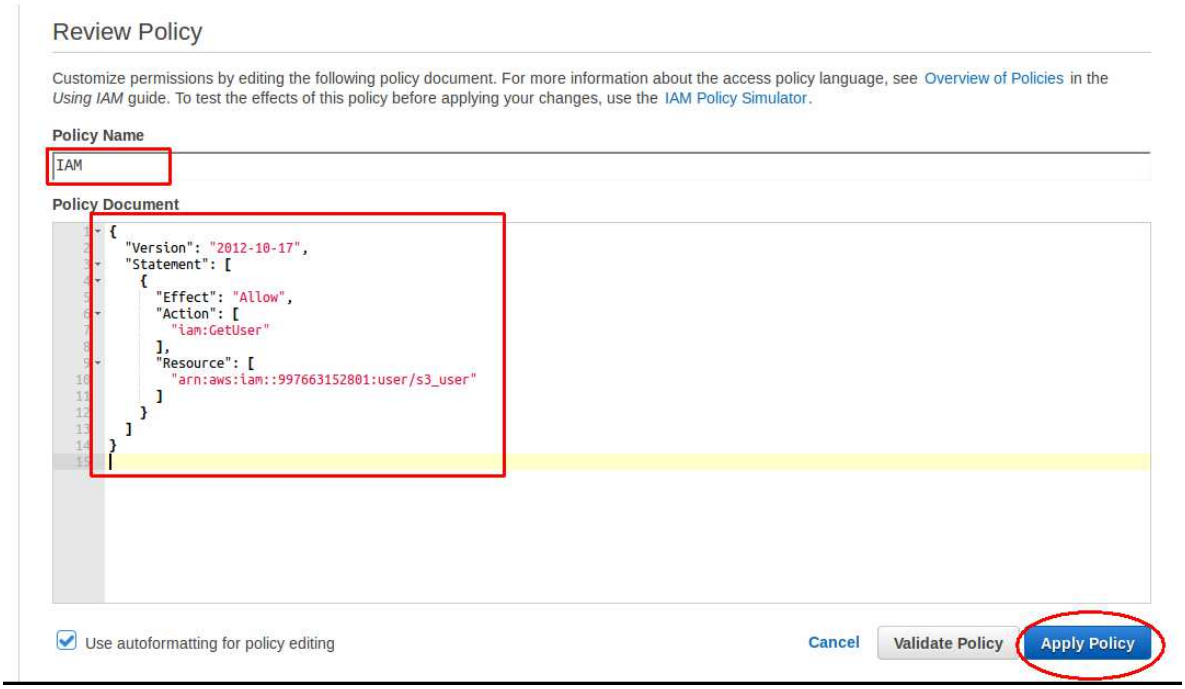
Create another Policy for IAM

Creation Time: 2016-09-13 11:39 UTC+0200

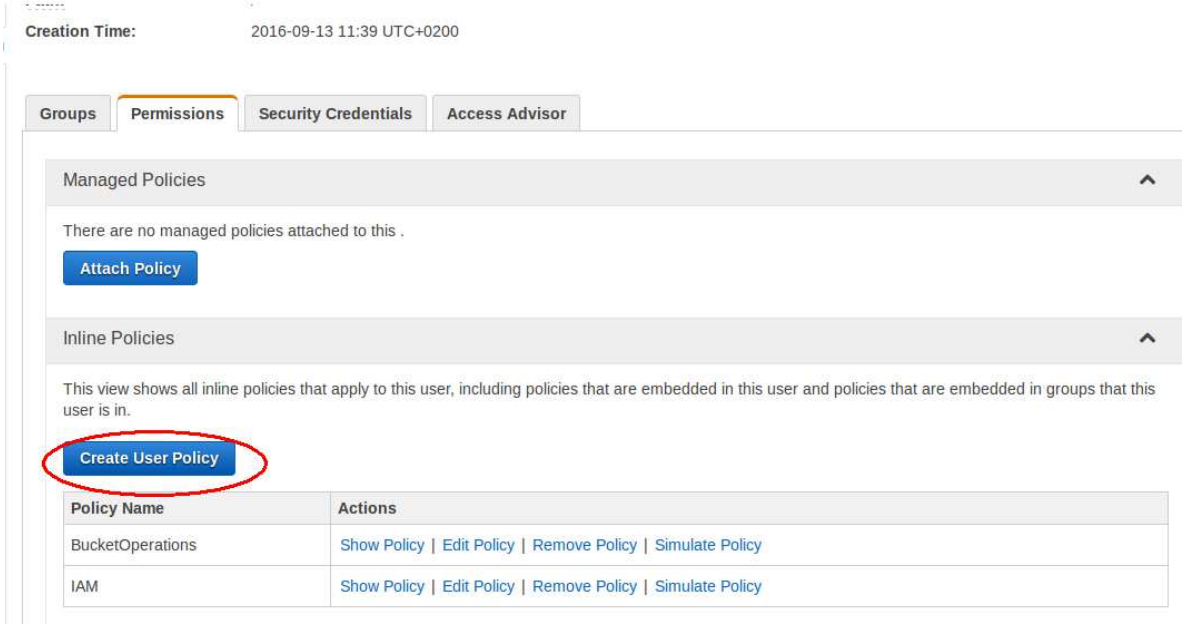


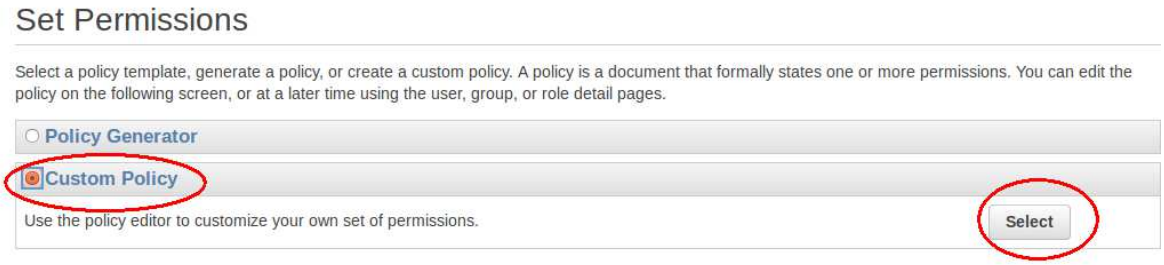


Policy name, and paste the policy. Apply Policy

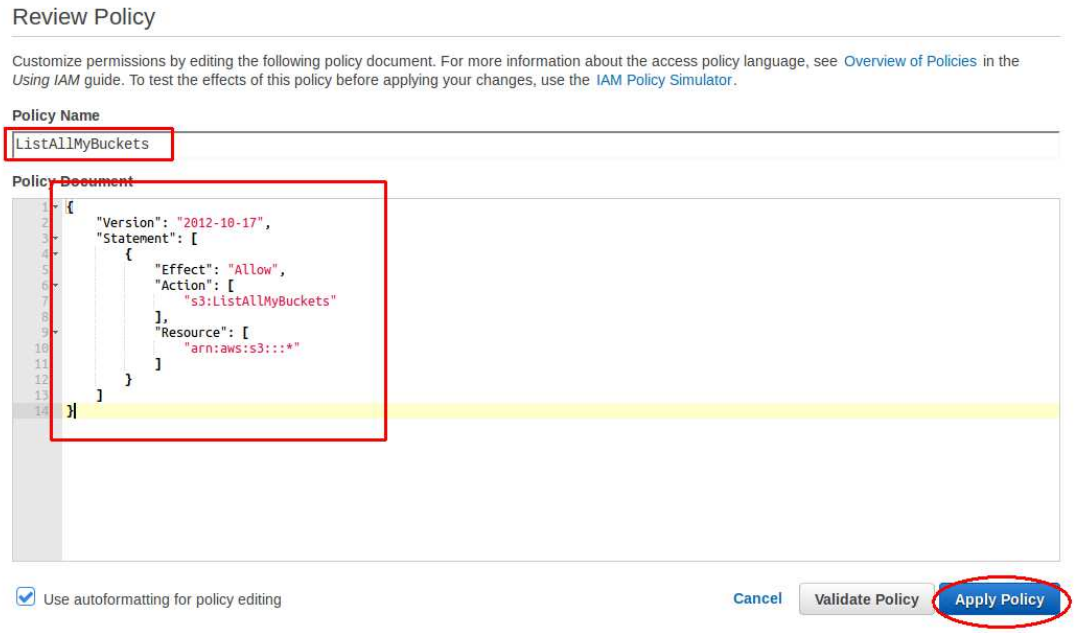


Create another Policy for ListAllMyBuckets.





Policy name, and paste the policy. Apply Policy



With this ends IAM user preparation

Actions to do in SAP target system

Authorizations to run S3 for SAP

To run S3 for SAP prepare a role with the following privileges:

S_RFC_ADM with ACTVT=*, RFCDEST=RS3_*

Put transport data file in DIR_TRANS/data

Put transport data file R900140.IDE in DIR_TRANS/data.

This can be done at operating system level or by using the transaction CG3Z if this transaction is available in the target system. Alternatively FM ARCHIVFILE_CLIENT_TO_SERVER can also be used (check on Uppercase/Lowercase)

Put transport cofiles file in DIR_TRANS/cofiles

Put transport data file K900140.IDE in DIR_TRANS/cofiles.

This can be done at operating system level or by using the transaction CG3Z if this transaction is available in the target system. Alternatively FM ARCHIVFILE_CLIENT_TO_SERVER can also be used (check on Uppercase/Lowercase)

Add transport request to transport queue and transport

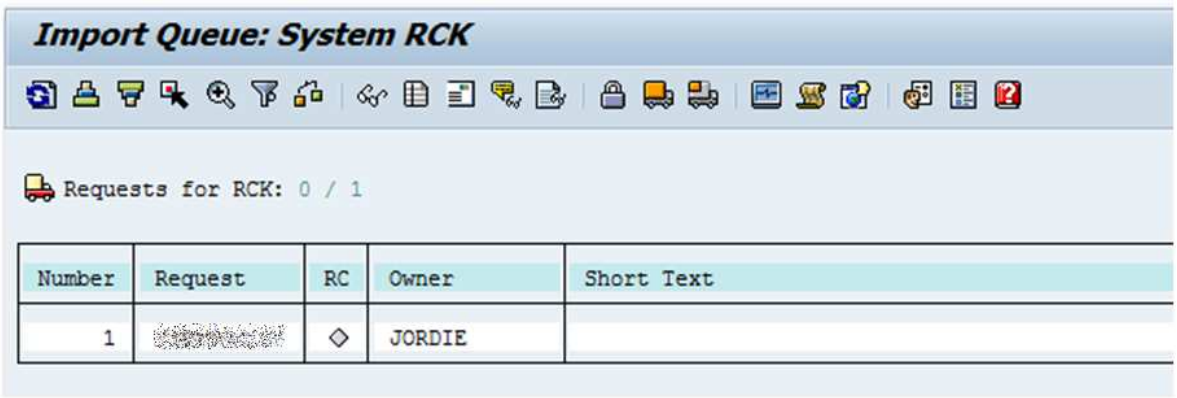
Go to transaction STMS.

Select the desired queue.

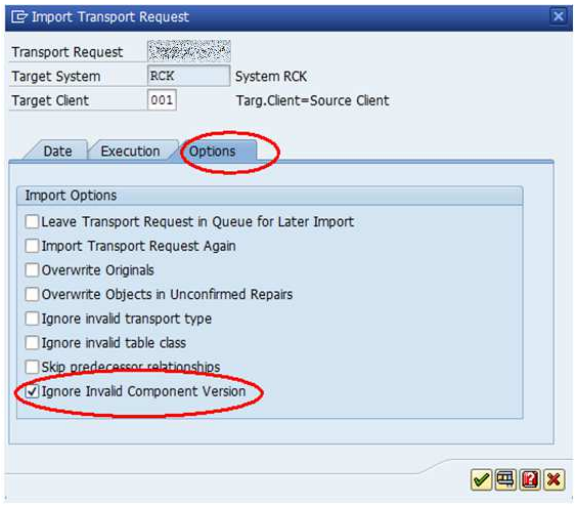
Menu → Extras → Other Requests → Add

Add order IDEK900140.

Probably the order will be shown with the icon  "Request does not match component version". This will happen in case component version in the order does not match with the component version in the target system. Do not worry about this.



Transport order selecting the option “Ignore Invalid Component Version”



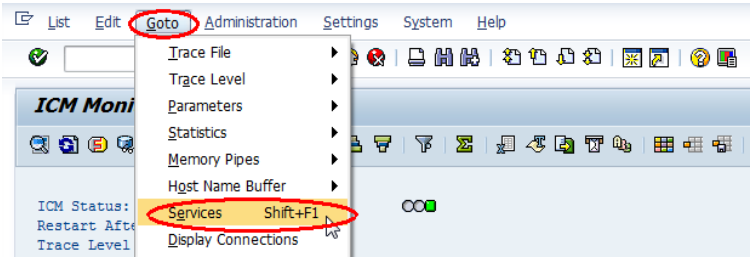
Answer Yes

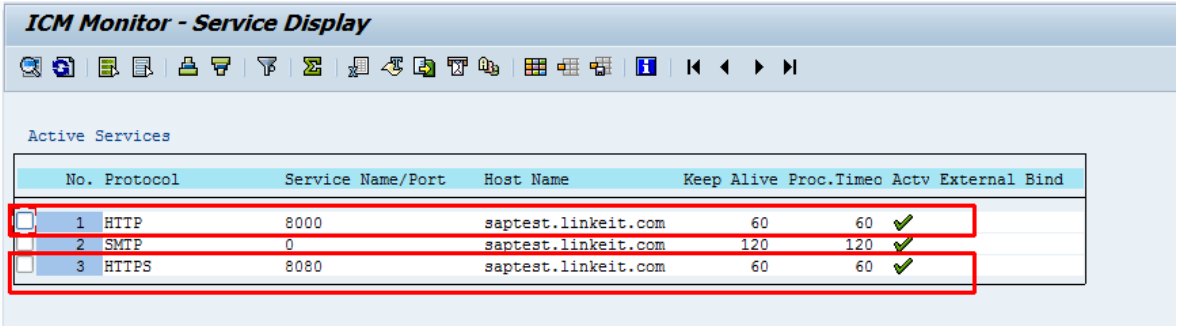
Wait until transport is finished.

Check HTTPS service

Ensure HTTP and HTTPS services are existing and active.

Go to transaction SMICM.





To learn more:

- https://help.sap.com/saphelp_nw75/helpdata/en/3b/68ec6e70d341ff9107988597db2324/content.htm Administration of the ICM
- http://scn.sap.com/docs/DOC-52056 "How to activate and define HTTP, HTTPS, SMTP ports in any SAP R/3 system"

STRUST

AWS S3 uses HTTPS protocol. In order to be able to communicate with AWS S3 endpoints the system must have a proper SSL certificate for each endpoint.

In SAP SSL certificates are installed in transaction STRUST.

To get AWS SSL certificates it is used OpenSSL from Operating System.

SSL certificates have a validity period, typically one year. Passed this period the certificate is not valid and cannot be used anymore.

AWS may invalidate any SSL certificate at any moment, even if the validity period is not expired. If this happens, the certificate cannot be used anymore and the communication with the endpoint will fail.

Manually maintaining SSL certificates may be a hard task. To ease this task we provide an automation tool, the program /RS3/RS3_STRUST.

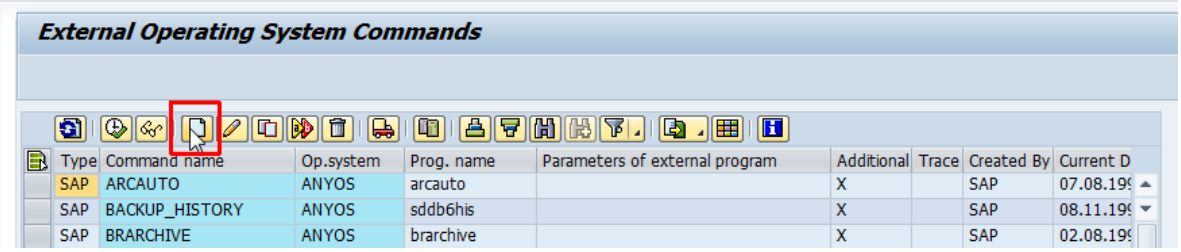
To learn more read
http://help.sap.com/saphelp_nw73ehp1/helpdata/en/4c/5b218c980a7514e10000000a42189b/content.htm

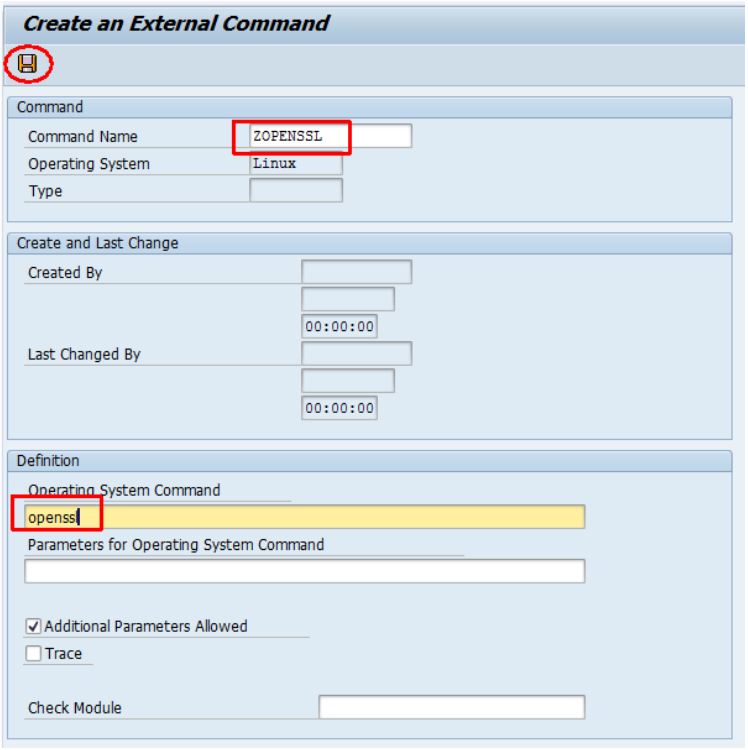
Program /RS3/RS3_STRUST

The system must be configured to add to STRUST in SSL client the AWS certificates.

This is automatically done with program /RS3/RS3_STRUST.

A preparation must be done prior running /RS3/RS3_STRUST. Run transaction SM69. If the operating system is Linux: Create a new command:

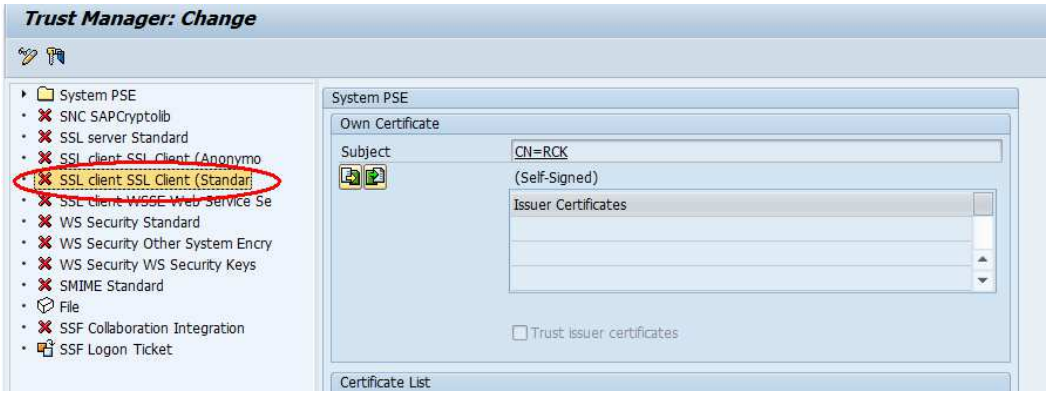




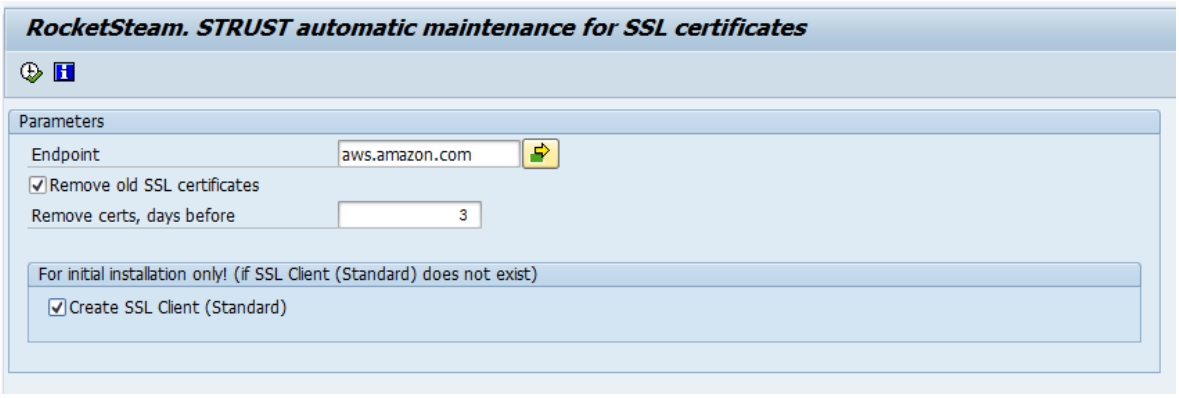
Note: openssl must be installed on linux

If your operating system is Windows install openssl and act in the same way.

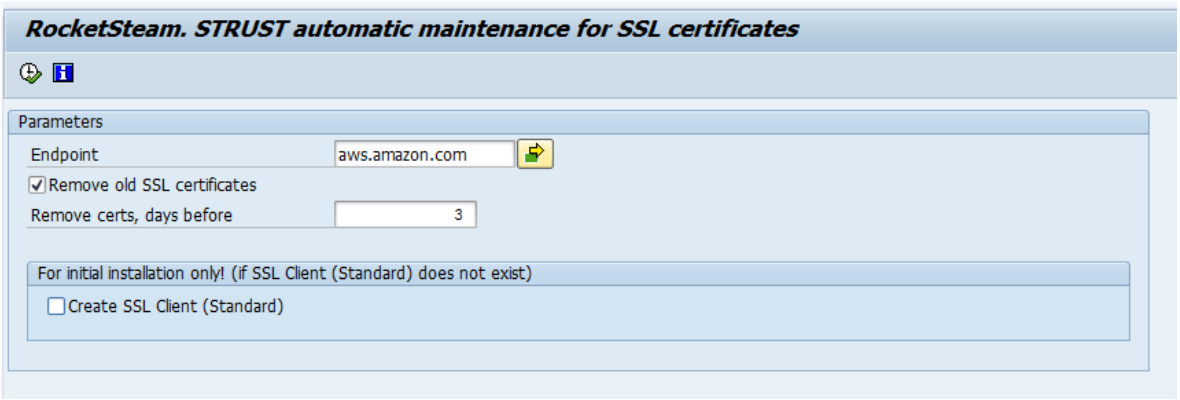
Go to transaction STRUST and check if SSL client SSL Client (standard) exists (in the sample screenshot is not existing):



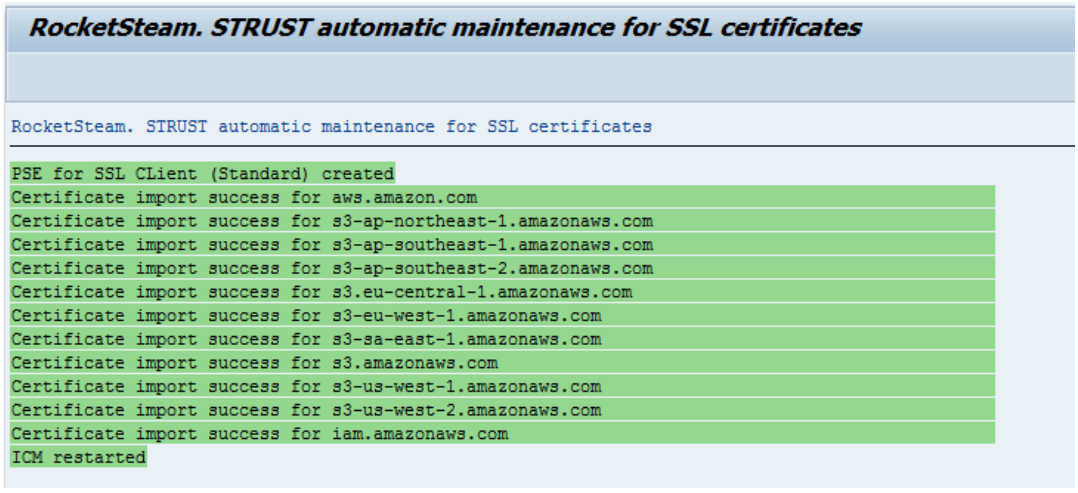
Run report (SE38) /RS3/RS3_STRUST with these parameters if SSL client SSL Client (standard) does not exist



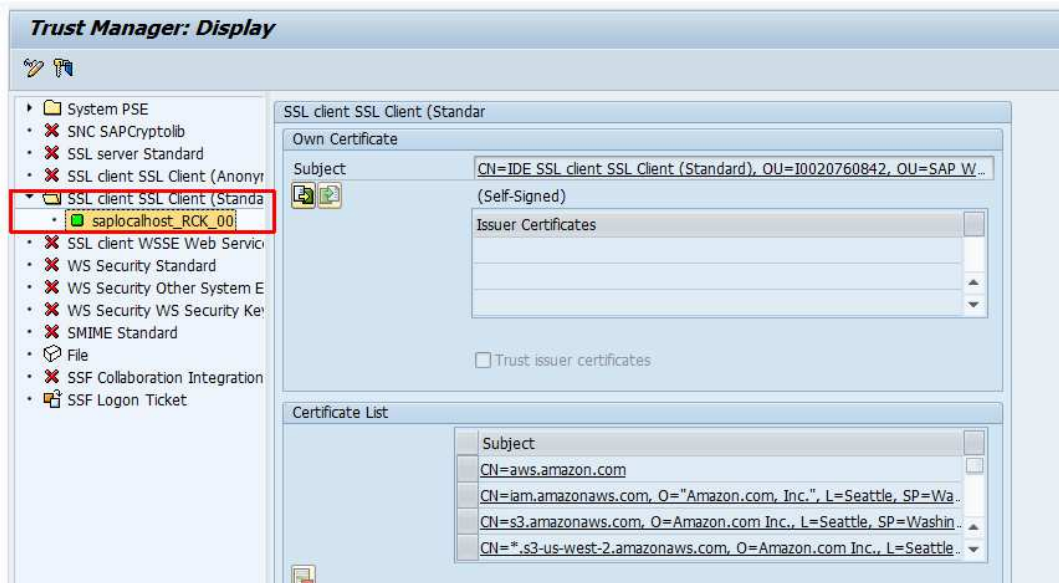
Run report (SE38) /RS3/RS3_STRUST with these parameters if SSL client SSL Client (standard) already exists:



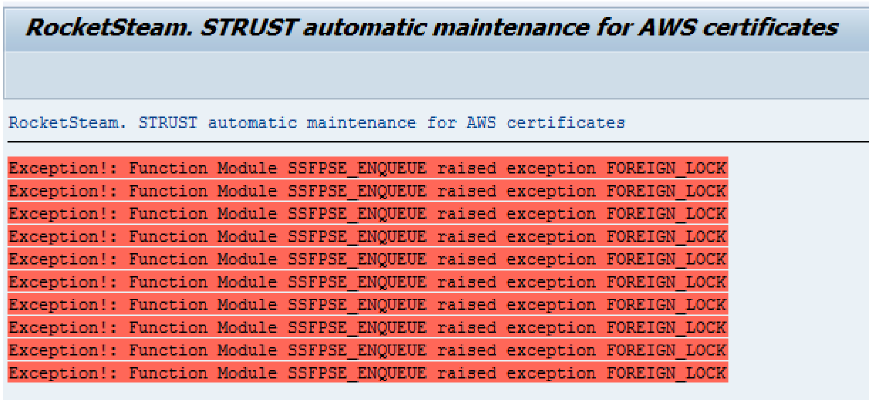
Expect to have this result:



You can check the result in transaction STRUST:



Note: In case some exception occurs it is shown in red, for example:



In this case the exception is due to STRUST foreign lock (i.e. someone is editing in transaction STRUST).

Programming job /RS3/RS3_STRUST

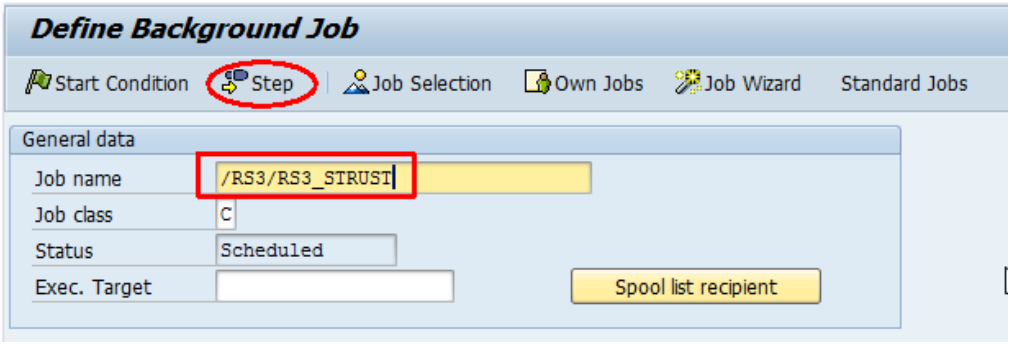
AWS certificates can be invalidated or can be expired.

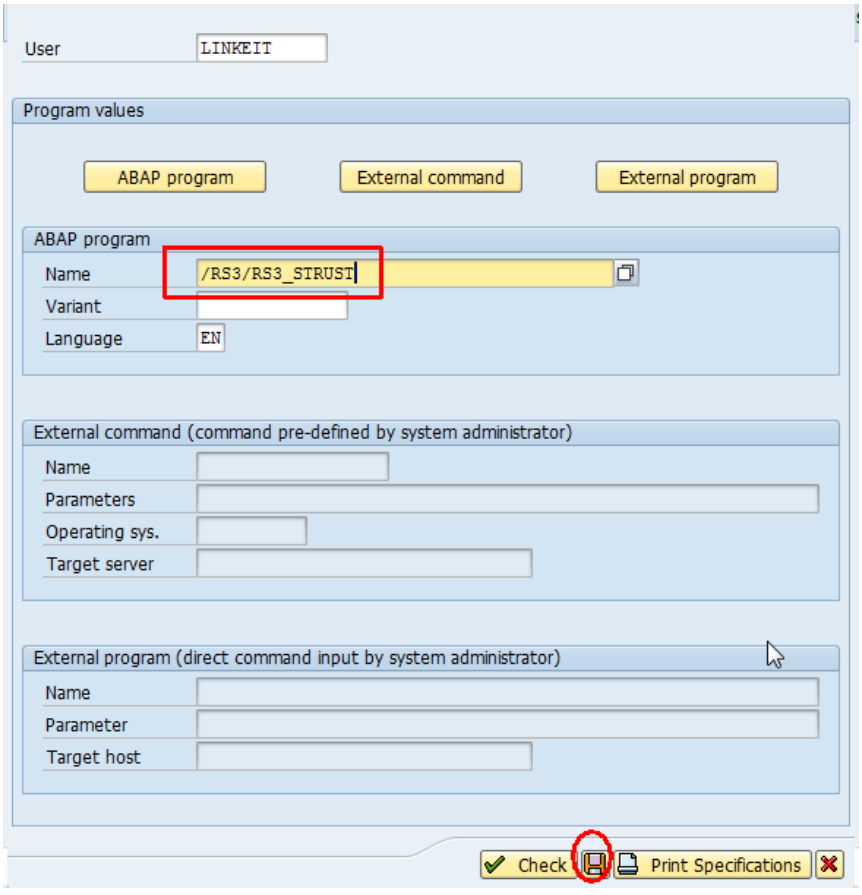
If this happens, new certificate(s) must be installed in STRUST to ensure S3 for SAP can run properly.

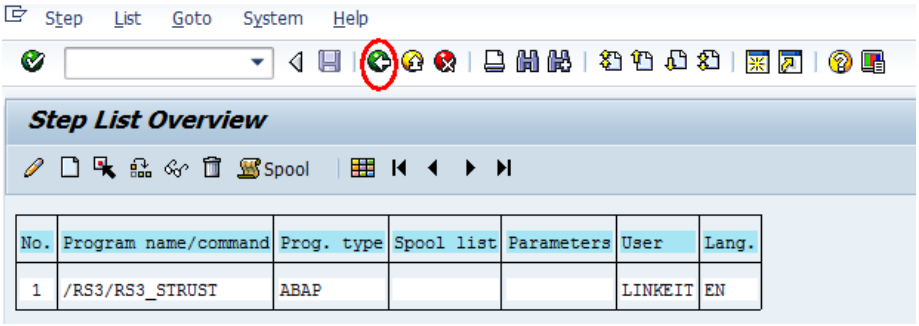
The program /RS3/RS3_STRUST will take care of it.

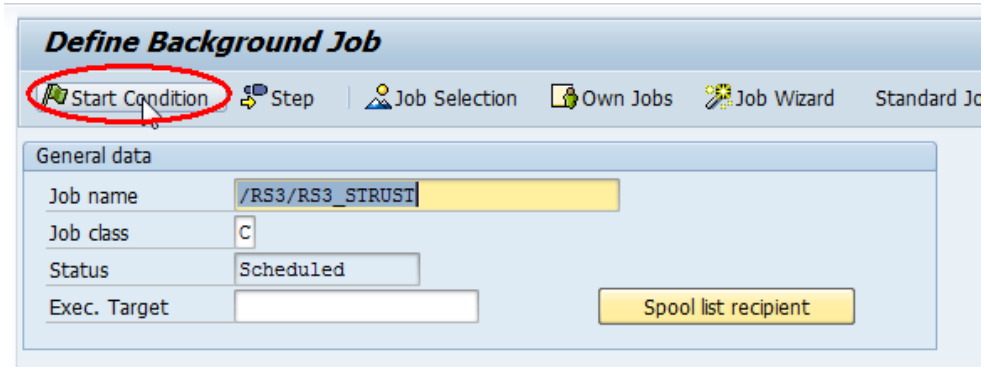
We recommend programming a job /RS3/RS3_STRUST on a daily basis.

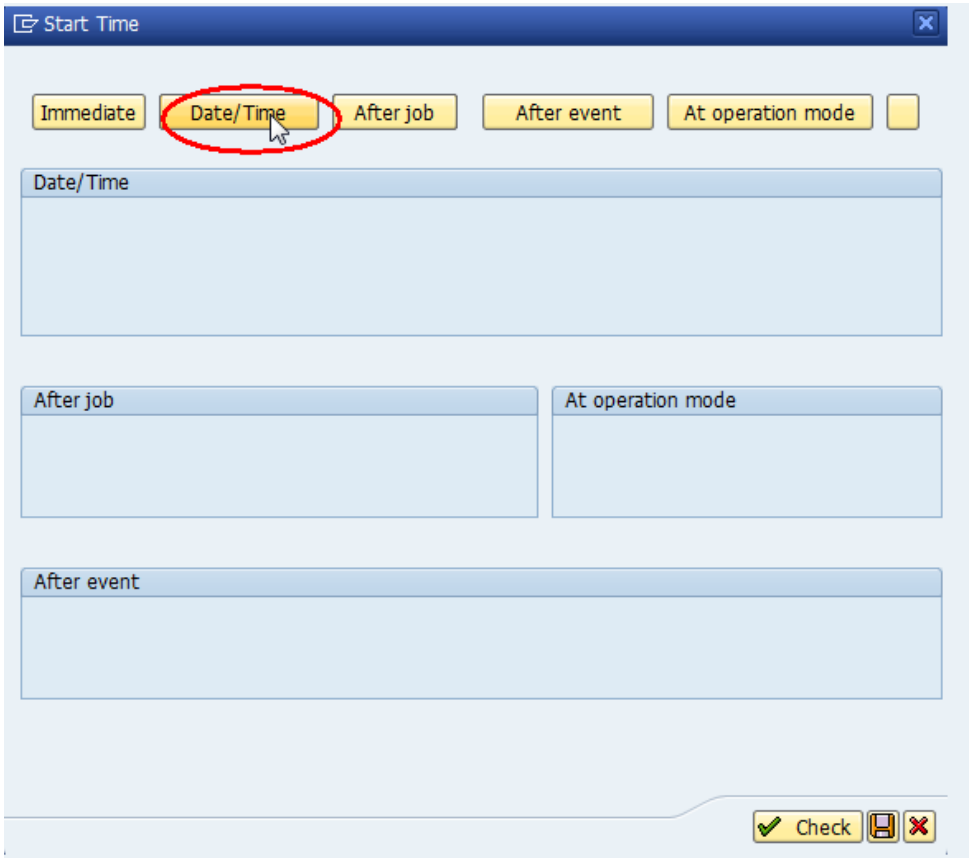
To do so, go to transaction SM36:



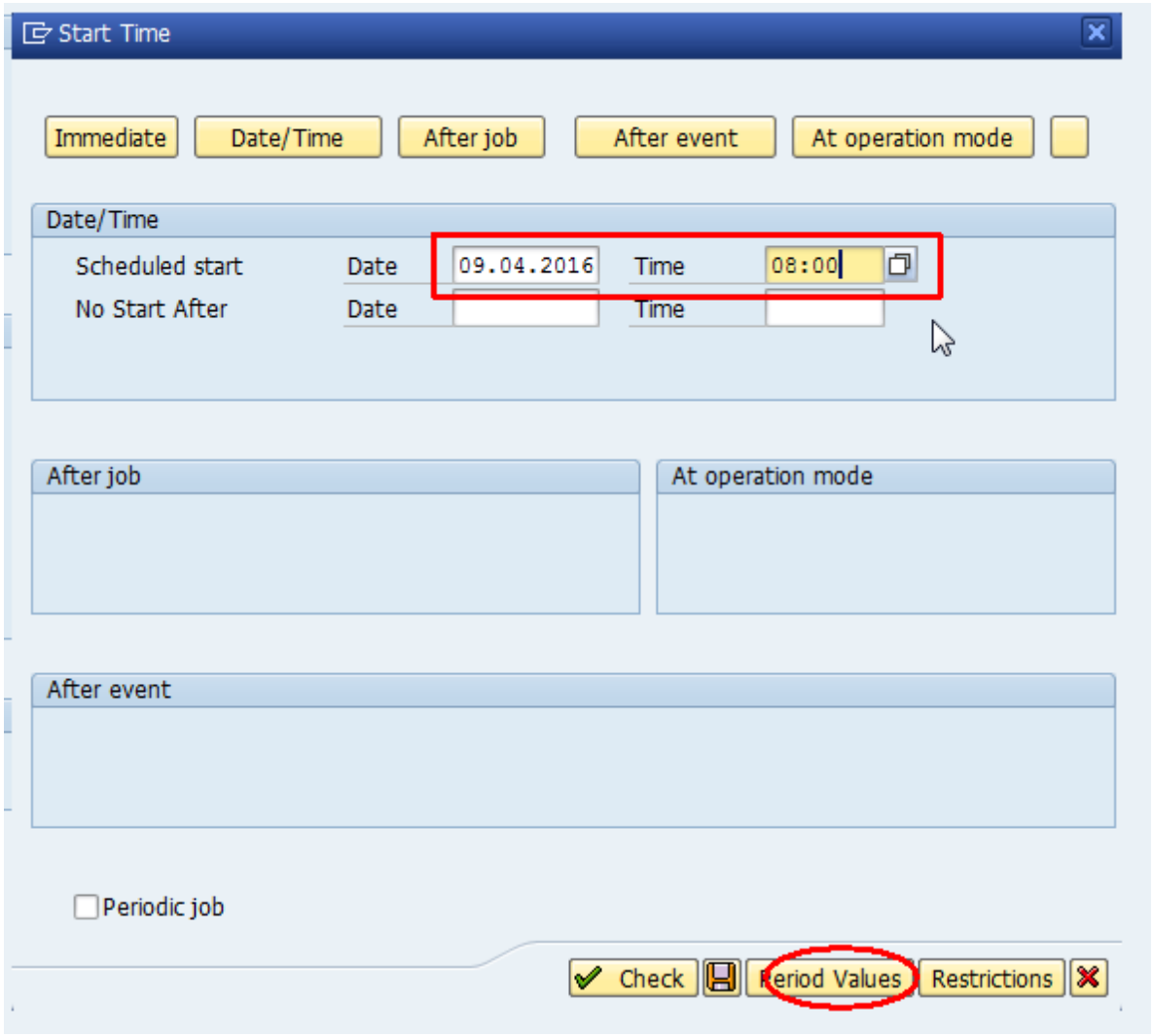




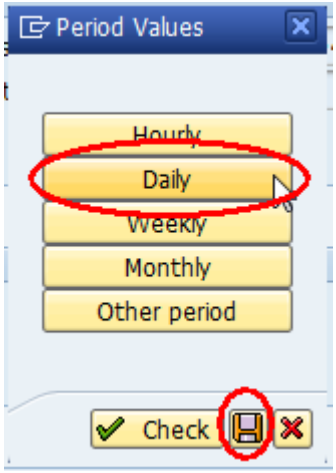

Define Background Job
Start Condition
Step
Job Selection
Own Jobs
Job Wizard
Standard Jo
General data
Job name
/RS3/RS3_STRUST
Job class
C
Status
Scheduled
Exec. Target
Spool list recipient


Start Time
Immediate
Date/Time
After job
After event
At operation mode
Date/Time
After job
At operation mode
After event
Check

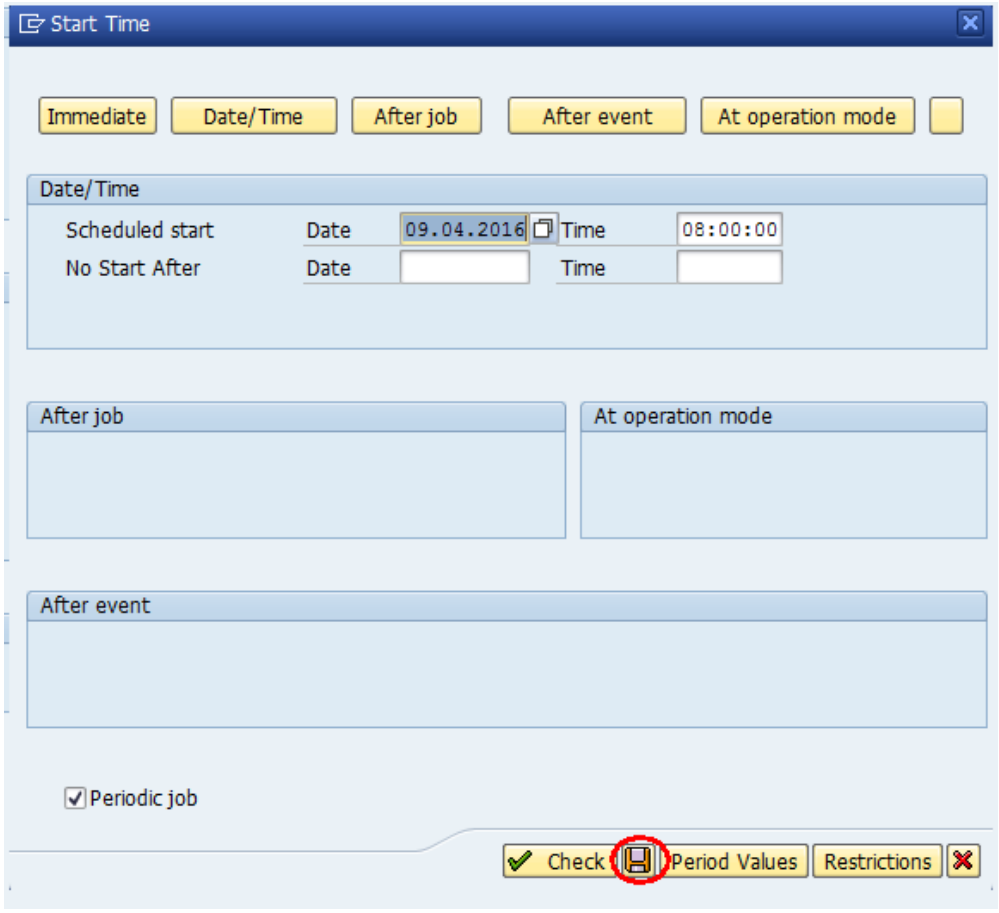
Inform the next day and the time you wish this job to run (the job takes a few seconds to execute, light workload).



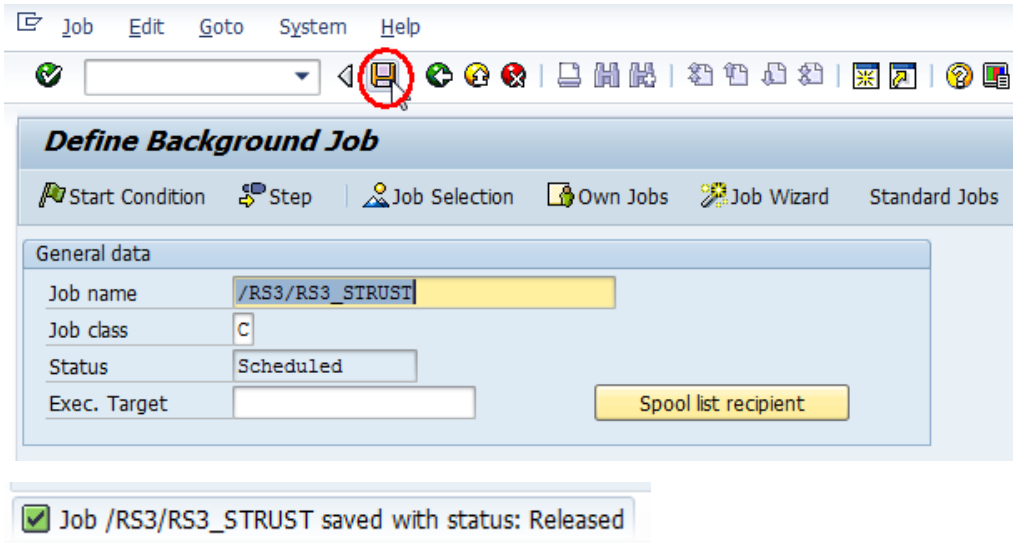
Choose daily period



Save

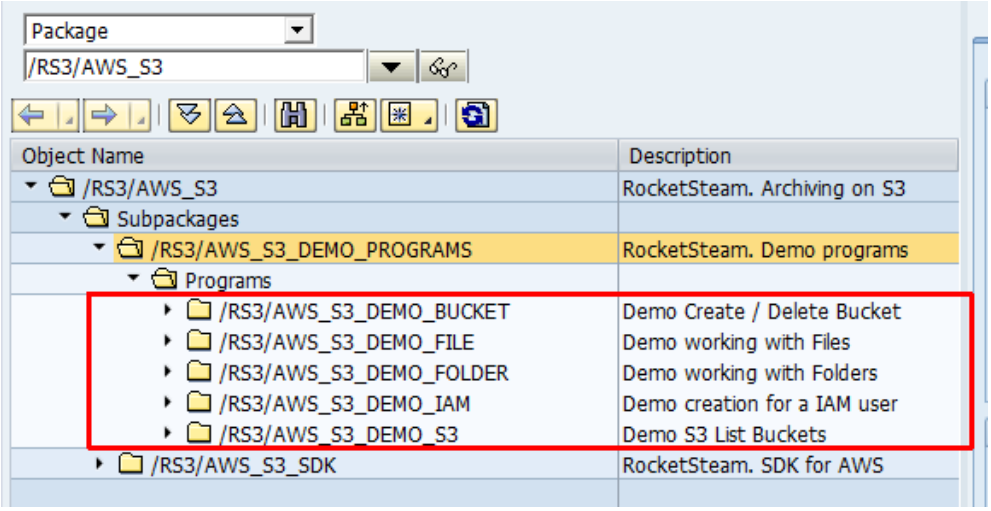


And save



Demo programs

Demo programs are provided under the package /RS3/AWS_S3_DEMO_PROGRAMS.



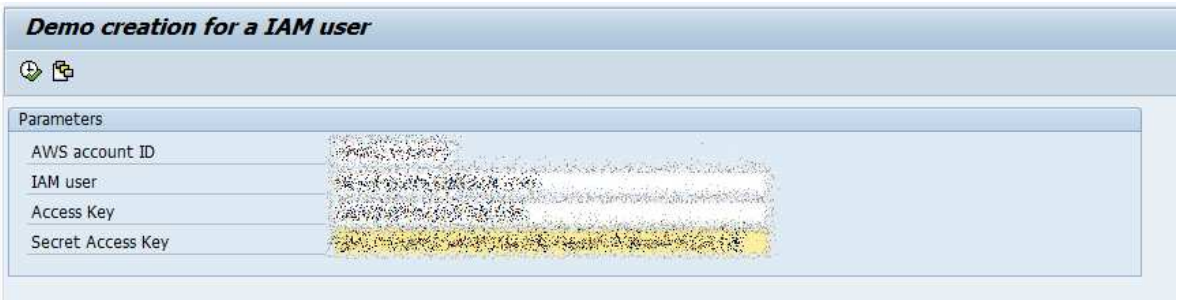
These programs can be used to test the initial setup and are intended to be a reference for developing your own applications.

Program /RS3/AWS_S3_DEMO_IAM

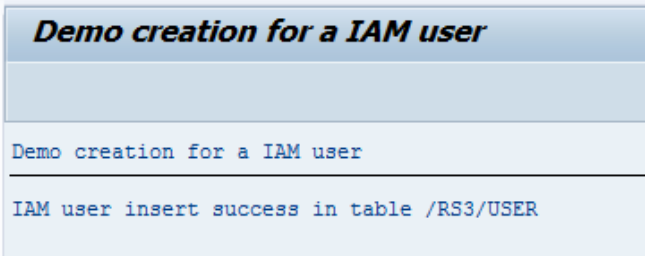
To use S3 for SAP you need to create an IAM user on your SAP system. This IAM user must already been created on AWS, and must have proper permissions.

Demo program /RS3/AWS_S3_DEMO_IAM shows how to create the IAM user in your SAP system.

Fill your credentials and run the program



On success, expect to have this result:



In case an exception occurs, for example:

Double check:

- Your AWS account ID
- Your IAM user
- The Attached Policies to the IAM user

From now you can start operating on buckets by using this IAM user.

The IAM user is inserted on database table /RS3/USER.

Technical explanation

Local class lcl_iam_demo has the method execute.

```
METHOD execute.
  DATA: lv_msg TYPE string.
  DATA: lv_user_name  TYPE /rs3/username_de.
  DATA: lv_aws_account_id TYPE /rs3/aws_account_id_de.
  DATA: lv_access_key TYPE /rs3/acckey_de.
  DATA: lv_secret_access_key  TYPE /rs3/secacckey_de.
  DATA: lv_user_id TYPE string.                          "#EC NEEDED
  DATA: ls_rs3_user TYPE /rs3/user.
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
      IF /rs3/cl_rfc_connections=>http_dest_to_ext_exists_iam( ) = abap_false.
        /rs3/cl_rfc_connections=>create_http_dest_to_ext_iam( ).
        WRITE:/ 'Created AWS destination for IAM endpoint'.
      ENDIF.

      lv_user_name = p_iam.
      lv_aws_account_id = p_aws.
      lv_access_key = p_key.
      lv_secret_access_key = p_seckey.
      CALL METHOD /rs3/cl_aws_iam=>check_aws_user
        EXPORTING
          i_user_name         = lv_user_name
          i_aws_account_id    = lv_aws_account_id
          i_access_key        = lv_access_key
          i_secret_access_key = lv_secret_access_key
        RECEIVING
          e_user_id           = lv_user_id.

      ls_rs3_user-user_name = lv_user_name.
      ls_rs3_user-access_key = lv_access_key.
      ls_rs3_user-secr_access_key = lv_secret_access_key.
      ls_rs3_user-aws_account_id = lv_aws_account_id.
      ls_rs3_user-crusr = sy-uname.
      ls_rs3_user-crdat = sy-datum.
      ls_rs3_user-crtim = sy-uzeit.
      INSERT /rs3/user FROM ls_rs3_user.
      IF sy-subrc = 0.
        WRITE:/ 'IAM user insert success in table /RS3/USER'.
      ENDIF.

    CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
      lv_msg = lr_cx_aws_s3->get_text( ).
      WRITE:/ lv_msg.
  ENDTRY.
```

The static method /RS3/CL_AWS_IAM=>CHECK_AWS_USER is called prior inserting the user on table /RS3/USER.

Any exception which may arise, for example if the user does not exist will be catched and shown the exception text.

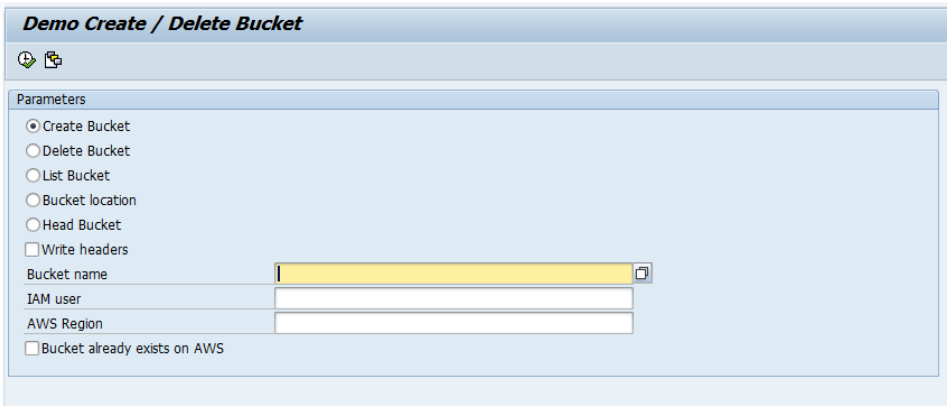
Program /RS3/AWS_S3_DEMO_BUCKET

Demo program /RS3/AWS_S3_DEMO_BUCKET shows how to operate on Buckets.

Possible operations are:

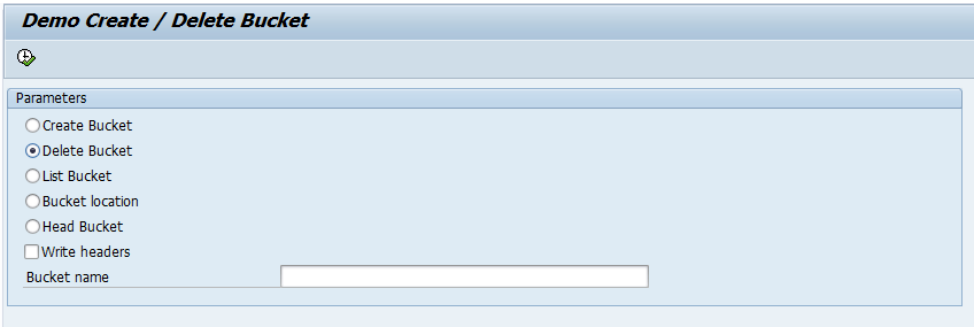
- Create Bucket
- Delete Bucket
- List Bucket
- List Bucket Location
- Head Bucket

Selection screen:



Note1: If you already have a bucket created on AWS, just fill the bucket name, IAM user and AWS region where the bucket exists and mark de flag “Bucket already exists on AWS”.

Note2: In order to protect the buckets from cross reading / writing from development systems and production systems, the SID is concatenated in front of the bucket name, in lower case and is created with this name in AWS.



Write headers parameter is to see the request and response headers.

Technical explanation

Each operation is implemented in a static method of the local class lcl_demo_bucket.

create_bucket

The static method /rs3/cl_aws_s3_bucket=>create_bucket is called to create a Bucket on AWS. On success it returns an instance of the Bucket created.

```
METHOD create_bucket.
  DATA: lv_xml TYPE string.
  DATA: lv_msg TYPE string.
  DATA: lv_http_status TYPE i.
  DATA: ls_/rs3/bucket TYPE /rs3/bucket.
  DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.      "#EC NEEDED
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
      CALL METHOD /rs3/cl_aws_s3_bucket=>create_bucket
        EXPORTING
          i_bucket_name      = p_bucket
          i_user_name        = p_iam
          i_region           = p_region
          i_dbg              = p_dbg
        IMPORTING
          e_http_status      = lv_http_status
          e_response_content = lv_xml
          e_aws_s3_bucket    = lr_bucket. "Reference to the bucket created

      IF lv_xml IS NOT INITIAL.
        /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
      ENDIF.

      IF lv_http_status = /rs3/cl_http=>c_status_200_ok.
        ls_/rs3/bucket-bucket = p_bucket.
        ls_/rs3/bucket-user_name = p_iam.
        ls_/rs3/bucket-region = p_region.
        ls_/rs3/bucket-crusr = sy-uname.
        ls_/rs3/bucket-crdat = sy-datum.
        ls_/rs3/bucket-crtim = sy-uzeit.
        INSERT /rs3/bucket FROM ls_/rs3/bucket.
        CONCATENATE 'Bucket ' p_bucket ' created successfully'
                INTO lv_msg RESPECTING BLANKS.
      ELSE.
        CONCATENATE 'Bucket ' p_bucket ' could not be created'
                INTO lv_msg RESPECTING BLANKS.
      ENDIF.
      CONDENSE lv_msg.
      WRITE:/ lv_msg.

    CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
      lv_msg = lr_cx_aws_s3->get_text( ).
      WRITE:/ lv_msg.
  ENDTRY.
```

Any exception which may arise will be catched and shown the exception text.

The bucket created is inserted in table /RS3/BUCKET

create_bucket_only_db

If you already have your bucket created on AWS you use this method to create a register in table /RS3/BUCKET

```
*---------------------------------------------------------------------*
* Creates a Bucket only on DB. Makes sense when your bucket
* is already existing on AWS.
*---------------------------------------------------------------------*
  METHOD create_bucket_only_db.
    DATA: lv_msg TYPE string.
    DATA: lv_bucket TYPE /rs3/bucket-bucket.
    DATA: ls_/rs3/bucket TYPE /rs3/bucket.

    SELECT SINGLE bucket
             INTO lv_bucket
    FROM /rs3/bucket
    WHERE bucket = p_bucket.
    IF sy-subrc <> 0.
      ls_/rs3/bucket-bucket = p_bucket.
      ls_/rs3/bucket-user_name = p_iam.
      ls_/rs3/bucket-region = p_region.
      ls_/rs3/bucket-no_prefix = abap_true.
      ls_/rs3/bucket-crusr = sy-uname.
      ls_/rs3/bucket-crdat = sy-datum.
      ls_/rs3/bucket-crtim = sy-uzeit.
      INSERT /rs3/bucket FROM ls_/rs3/bucket.
      CONCATENATE 'Bucket ' p_bucket ' created successfully'
             INTO lv_msg RESPECTING BLANKS.
    ELSE.
      CONCATENATE 'Bucket ' p_bucket ' already exists in DB'
             INTO lv_msg RESPECTING BLANKS.
    ENDIF.
    CONDENSE lv_msg.
    WRITE:/ lv_msg.

  ENDMETHOD.                    "create_bucket_only_db
```

delete_bucket

The bucket object lr_bucket is instantiated giving the bucket name. After the method delete_bucket is called.

The bucket must be empty to be deleted.

On success the bucket is deleted from AWS and from table /RS3/BUCKET.

```
*---------------------------------------------------------------------*
* Deletes a Bucket (must be empty)
*---------------------------------------------------------------------*
  METHOD delete_bucket.
    DATA: lv_xml TYPE string.
    DATA: lv_msg TYPE string.
    DATA: lv_http_status TYPE i.
    DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

    TRY.
        CREATE OBJECT lr_bucket
          EXPORTING
            i_bucket_name = p_bucket
            i_dbg         = p_dbg.

        CALL METHOD lr_bucket->delete_bucket
          IMPORTING
            e_http_status      = lv_http_status
            e_response_content = lv_xml.

        IF lv_xml IS NOT INITIAL.
          /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
        ENDIF.

        IF lv_http_status = /rs3/cl_http=>c_status_204_no_content.
          DELETE FROM /rs3/bucket WHERE bucket = p_bucket.
          CONCATENATE 'Bucket ' p_bucket ' deleted successfully'
                INTO lv_msg RESPECTING BLANKS.
        ELSE.
          CONCATENATE 'Bucket ' p_bucket ' could not be deleted'
                INTO lv_msg RESPECTING BLANKS.
        ENDIF.
        CONDENSE lv_msg.
        WRITE:/ lv_msg.

      CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
        lv_msg = lr_cx_aws_s3->get_text( ).
        WRITE:/ lv_msg.
    ENDTRY.

  ENDMETHOD.                    "delete_bucket
```

Any exception which may arise will be catched and shown the exception text.

list_bucket

The bucket object lr_bucket is instantiated giving the bucket name. After the method list_objects is called. It returns an XML containing the list, limited to a maximum of 1000 entries. You can use i_prefix parameter to filter the list by a prefix.

Parameter i_marker is used for paging in case you want to get more than 1000 entries.

Parameter i_max_keys is used if you wish to limit to a lower number of entries.

```
*---------------------------------------------------------------------*
* Lists Bucket content
*---------------------------------------------------------------------*
  METHOD list_bucket.
    DATA: lv_xml TYPE string.
    DATA: lv_msg TYPE string.
    DATA: lv_http_status TYPE i.                          "#EC NEEDED
    DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

    TRY.
        CREATE OBJECT lr_bucket
          EXPORTING
            i_bucket_name = p_bucket
            i_dbg         = p_dbg.

        CALL METHOD lr_bucket->list_objects
*           EXPORTING
*             i_prefix           =
*             i_marker           =
*             i_max_keys         =
          IMPORTING
            e_http_status      = lv_http_status
            e_response_content = lv_xml.

        IF lv_xml IS NOT INITIAL.
          /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
        ENDIF.

      CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
        lv_msg = lr_cx_aws_s3->get_text( ).
        WRITE:/ lv_msg.
    ENDTRY.
  ENDMETHOD.                    "list_bucket
```

Any exception which may arise will be catched and shown the exception text.

bucket_location

The bucket object lr_bucket is instantiated giving the bucket name. After the method get_bucket_location is called. It returns an XML containing the AWS region where the Bucket is located

```
*---------------------------------------------------------------------*
* Shows Bucket location
*---------------------------------------------------------------------*
  METHOD bucket_location.
    DATA: lv_xml TYPE string.
    DATA: lv_msg TYPE string.
    DATA: lv_http_status TYPE i.                              "#EC NEEDED
    DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

    TRY.
        CREATE OBJECT lr_bucket
          EXPORTING
            i_bucket_name = p_bucket
            i_dbg         = p_dbg.

        CALL METHOD lr_bucket->get_bucket_location
          IMPORTING
            e_http_status      = lv_http_status
            e_response_content = lv_xml.

        IF lv_xml IS NOT INITIAL.
          /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
        ENDIF.

      CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
        lv_msg = lr_cx_aws_s3->get_text( ).
        WRITE:/ lv_msg.
    ENDTRY.

  ENDMETHOD.                    "bucket_location
```

Any exception which may arise will be catched and shown the exception text.

head_bucket

This can be used to check that the bucket exists.

The bucket object lr_bucket is instantiated giving the bucket name. After the method head_bucket is called. It will return HTTP Status.

```
*---------------------------------------------------------------------*
* Head
*---------------------------------------------------------------------*
  METHOD head_bucket.
    DATA: lv_msg TYPE string.
    DATA: lv_http_status TYPE i.
    DATA: lt_response_headers TYPE tihttpnvp.              "#EC NEEDED
    DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

    TRY.
        CREATE OBJECT lr_bucket
          EXPORTING
            i_bucket_name = p_bucket
            i_dbg         = p_dbg.

        CALL METHOD lr_bucket->head_bucket
          IMPORTING
            e_http_status      = lv_http_status
            e_response_headers = lt_response_headers.

        lv_msg = /rs3/cl_http=>get_reason_by_status( lv_http_status ).
        WRITE:/ lv_http_status, lv_msg.

      CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
        lv_msg = lr_cx_aws_s3->get_text( ).
        WRITE:/ lv_msg.
    ENDTRY.
  ENDMETHOD.                    "head_bucket
```

Any exception which may arise will be catched and shown the exception text.

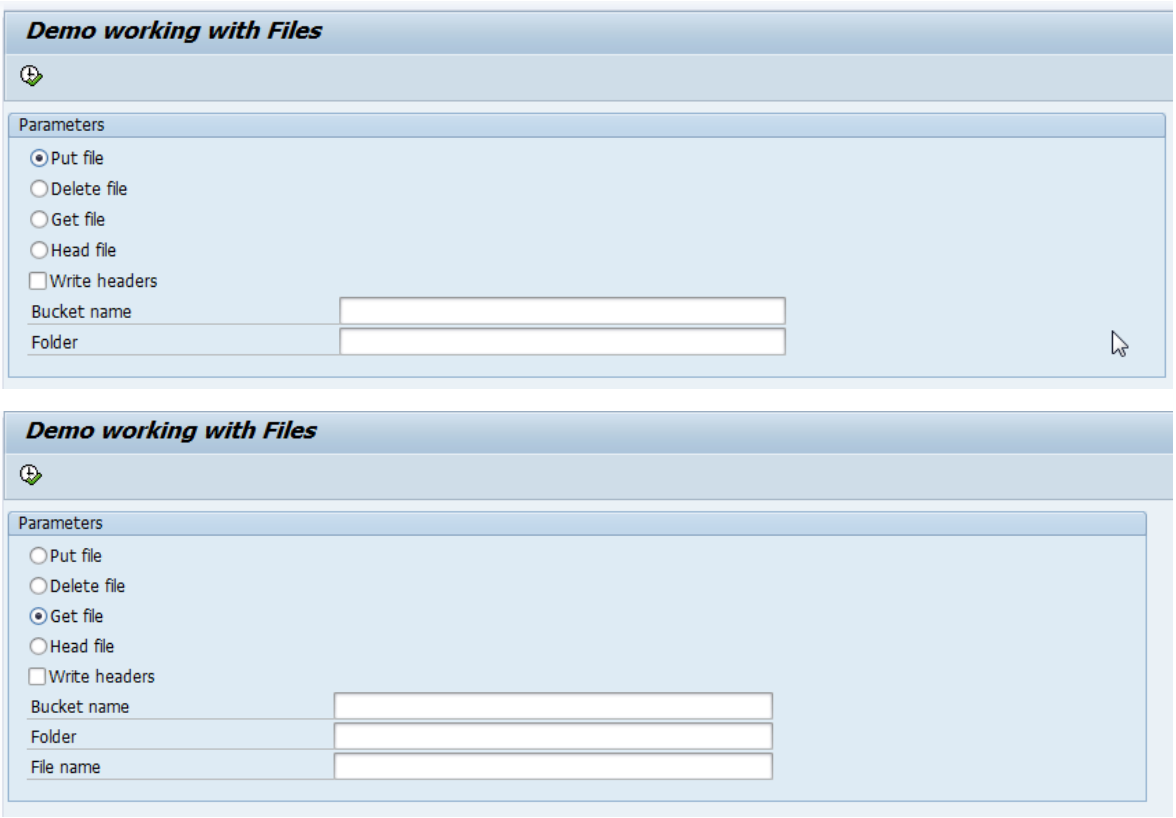
Program /RS3/AWS_S3_DEMO_FILE

Demo program /RS3/AWS_S3_DEMO_FILE shows how to operate on files.

Possible operations are:

- Put file
- Delete file
- Get file
- Head file

Selection screen:



Write headers parameter is to see the request and response headers.

Technical explanation

Each operation is implemented in a static method of the local class lcl_demo_file.

put_file

The method select_and_get_file_bin is called to show a file select dialog. Once the file is selected it is read and the content is set in lv_content.

Filename and folder are escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method put_object is called, giving the file name and content.

```
METHOD put_file.
  DATA: lv_filename TYPE string,
        lv_folder TYPE string.
  DATA: lv_content TYPE xstring.
  DATA: lv_msg TYPE string.
  DATA: lv_xml TYPE string.
  DATA: lv_http_status TYPE i.
  DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
      select_and_get_file_bin( IMPORTING ex_filename = lv_filename
                                         ex_content  = lv_content ).

*     Escape for considering special characters in file name
      lv_filename = /rs3/cl_http=>escape_url( lv_filename ).
      IF p_folder IS NOT INITIAL.
        lv_folder = /rs3/cl_http=>escape_url( p_folder ).
        CONCATENATE lv_folder '/' lv_filename INTO lv_filename.
      ENDIF.

      CREATE OBJECT lr_bucket
        EXPORTING
          i_bucket_name = p_bucket
          i_dbg         = p_dbg.

      CALL METHOD lr_bucket->put_object
        EXPORTING
          i_object_name      = lv_filename
          i_xcontent         = lv_content
          i_escape_url       = abap_false
        IMPORTING
          e_http_status      = lv_http_status
          e_response_content = lv_xml.

      IF lv_xml IS NOT INITIAL.
        /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
      ENDIF.

      IF lv_http_status = /rs3/cl_http=>c_status_200_ok.
        CONCATENATE 'File ' lv_filename ' created successfully'
               INTO lv_msg RESPECTING BLANKS.
      ELSE.
        CONCATENATE 'File ' lv_filename ' could not be created'
               INTO lv_msg RESPECTING BLANKS.
      ENDIF.
      CONDENSE lv_msg
```

Any exception which may arise will be catched and shown the exception text.

delete_file

Filename and folder are escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method head_object is called, giving the file name. If the file exists the method delete_object is called. HTTP 204 No content is returned on success.

```
METHOD delete_file.
  DATA: lv_filename TYPE string,
        lv_folder TYPE string.
  DATA: lv_msg TYPE string.
  DATA: lv_xml TYPE string.
  DATA: lv_http_status TYPE i.
  DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
*       Escape for considering special characters in file name
      lv_filename = /rs3/cl_http=>escape_url( p_fname ).
      IF p_folder IS NOT INITIAL.
        lv_folder = /rs3/cl_http=>escape_url( p_folder ).
        CONCATENATE lv_folder '/' lv_filename INTO lv_filename.
      ENDIF.

      CREATE OBJECT lr_bucket
        EXPORTING
          i_bucket_name = p_bucket
          i_dbg         = p_dbg.

      CALL METHOD lr_bucket->head_object
        EXPORTING
          i_object_name = lv_filename
        IMPORTING
          e_http_status = lv_http_status.

      IF lv_http_status = /rs3/cl_http=>c_status_200_ok.
        CALL METHOD lr_bucket->delete_object
          EXPORTING
            i_object_name      = lv_filename
          IMPORTING
            e_http_status      = lv_http_status
            e_response_content = lv_xml.

        IF lv_xml IS NOT INITIAL.
          /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
        ENDIF.

        IF lv_http_status = /rs3/cl_http=>c_status_204_no_content.
          CONCATENATE 'File ' lv_filename ' deleted successfully'
                 INTO lv_msg RESPECTING BLANKS.
        ELSE.
          CONCATENATE 'File ' lv_filename ' could not be deleted'
                 INTO lv_msg RESPECTING BLANKS.
        ENDIF.
```

Any exception which may arise will be catched and shown the exception text.

get_file

Filename and folder are escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method get_object is called, giving the file name. The file content is returned in lv_file_content (binary string). If the file is not existing, in lv_file_content is returned an XML with the error.

```
METHOD get_file.
  DATA: lv_filename TYPE string,
        lv_folder TYPE string.
  DATA: lv_msg TYPE string.
  DATA: lv_xml TYPE string.
  DATA: lv_file_content TYPE xstring.                    "#EC NEEDED
  DATA: lv_http_status TYPE i.
  DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
*       Escape for considering special characters in file name
      lv_filename = /rs3/cl_http=>escape_url( p_fname ).
      IF p_folder IS NOT INITIAL.
        lv_folder = /rs3/cl_http=>escape_url( p_folder ).
        CONCATENATE lv_folder '/' lv_filename INTO lv_filename.
      ENDIF.

      CREATE OBJECT lr_bucket
        EXPORTING
          i_bucket_name = p_bucket
          i_dbg         = p_dbg.

      CALL METHOD lr_bucket->get_object
        EXPORTING
          i_object_name       = lv_filename
        IMPORTING
          e_http_status       = lv_http_status
          e_response_xcontent = lv_file_content.  "File content is returned here

      IF lv_http_status = /rs3/cl_http=>c_status_200_ok.
        CONCATENATE 'File ' lv_filename ' retrieved successfully'
               INTO lv_msg RESPECTING BLANKS.
      ELSEIF lv_http_status = /rs3/cl_http=>c_status_404_not_found.
        CONCATENATE 'File ' lv_filename ' not found'
               INTO lv_msg RESPECTING BLANKS.

        /rs3/cl_string_conversions=>xstring_to_string(
                        EXPORTING input  = lv_file_content
                        IMPORTING output = lv_xml ).
        IF lv_xml IS NOT INITIAL.
          /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
        ENDIF.
      ENDIF.
      CONDENSE lv_msg.
      WRITE:/ lv_msg.
```

Any exception which may arise will be catched and shown the exception text.

head_file

Filename and folder are escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method head_object is called, giving the file name. HTTP status is returned. File length is returned in HTTP response headers.

```
*---------------------------------------------------------------------*
* This shows how to get file information without retrieving file content
* File lenght comes in response headers
*---------------------------------------------------------------------*
  METHOD head_file.
    DATA: lv_filename TYPE string,
          lv_folder TYPE string.
    DATA: lv_msg TYPE string.
    DATA: lv_http_status TYPE i.
    DATA: lt_response_headers TYPE tihttpnvp.                "#EC NEEDED
    DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

    TRY.
*       Escape for considering special characters in file name
        lv_filename = /rs3/cl_http=>escape_url( p_fname ).
        IF p_folder IS NOT INITIAL.
          lv_folder = /rs3/cl_http=>escape_url( p_folder ).
          CONCATENATE lv_folder '/' lv_filename INTO lv_filename.
        ENDIF.

        CREATE OBJECT lr_bucket
          EXPORTING
            i_bucket_name = p_bucket
            i_dbg         = p_dbg.

        CALL METHOD lr_bucket->head_object
          EXPORTING
            i_object_name      = lv_filename
          IMPORTING
            e_http_status      = lv_http_status
            e_response_headers = lt_response_headers.

        lv_msg = /rs3/cl_http=>get_reason_by_status( lv_http_status ).
        WRITE:/ lv_http_status, lv_msg.

      CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
        lv_msg = lr_cx_aws_s3->get_text( ).
        WRITE:/ lv_msg.
    ENDTRY.
  ENDMETHOD.                    "head_file
```

Any exception which may arise will be catched and shown the exception text.

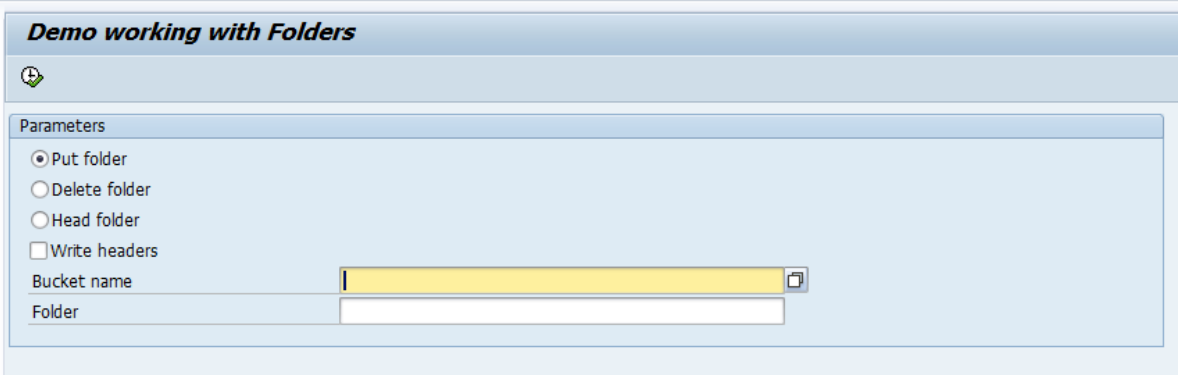
Program /RS3/AWS_S3_DEMO_FOLDER

Demo program /RS3/AWS_S3_DEMO_FILE shows how to operate on folders.

Possible operations are:

- Put folder
- Delete folder
- Head folder

Selection screen:



Write headers parameter is to see the request and response headers.

Technical explanation

Each operation is implemented in a static method of the local class lcl_demo_folder.

put_folder

The folder is escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method put_object is called, giving the folder name.

```
METHOD put_folder.
  DATA: lv_folder TYPE string.
  DATA: lv_msg TYPE string.
  DATA: lv_xml TYPE string.
  DATA: lv_http_status TYPE i.
  DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
      Escape for considering special characters in folder name
      lv_folder = /rs3/cl_http=>escape_url( p_folder ).
      CONCATENATE lv_folder '/' INTO lv_folder.

      CREATE OBJECT lr_bucket
        EXPORTING
          i_bucket_name = p_bucket
          i_dbg         = p_dbg.

      CALL METHOD lr_bucket->put_object
        EXPORTING
          i_object_name      = lv_folder
          i_escape_url       = abap_false
        IMPORTING
          e_http_status      = lv_http_status
          e_response_content = lv_xml.

      IF lv_xml IS NOT INITIAL.
        /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
      ENDIF.

      IF lv_http_status = /rs3/cl_http=>c_status_200_ok.
        CONCATENATE 'Folder ' lv_folder ' created successfully'
               INTO lv_msg RESPECTING BLANKS.
      ELSE.
        CONCATENATE 'Folder ' lv_folder ' could not be created'
               INTO lv_msg RESPECTING BLANKS.
      ENDIF.
      CONDENSE lv_msg.
      WRITE:/ lv_msg.

    CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
      lv_msg = lr_cx_aws_s3->get_text( ).
      WRITE:/ lv_msg.
  ENDTRY.
```

Any exception which may arise will be catched and shown the exception text.

delete_folder

The folder is escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method head_object is called, giving the folder name. If the folder exists the method delete_object is called, giving the folder name. HTTP 204 No content is returned on success.

```
  METHOD delete_folder.
    DATA: lv_folder TYPE string.
    DATA: lv_msg TYPE string.
    DATA: lv_xml TYPE string.
    DATA: lv_http_status TYPE i.
    DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

    TRY.
*       Escape for considering special characters in folder name
        lv_folder = /rs3/cl_http=>escape_url( p_folder ).
        CONCATENATE lv_folder '/' INTO lv_folder.

        CREATE OBJECT lr_bucket
          EXPORTING
            i_bucket_name = p_bucket
            i_dbg         = p_dbg.

        CALL METHOD lr_bucket->head_object
          EXPORTING
            i_object_name = lv_folder
          IMPORTING
            e_http_status = lv_http_status.

        IF lv_http_status = /rs3/cl_http=>c_status_200_ok.
          CALL METHOD lr_bucket->delete_object
            EXPORTING
              i_object_name      = lv_folder
            IMPORTING
              e_http_status      = lv_http_status
              e_response_content = lv_xml.

          IF lv_xml IS NOT INITIAL.
            /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
          ENDIF.

          IF lv_http_status = /rs3/cl_http=>c_status_204_no_content.
            CONCATENATE 'Folder ' lv_folder ' deleted successfully'
                   INTO lv_msg RESPECTING BLANKS.
          ELSE.
            CONCATENATE 'Folder ' lv_folder ' could not be deleted'
                   INTO lv_msg RESPECTING BLANKS.
          ENDIF.
          CONDENSE lv_msg.
          WRITE:/ lv_msg.
```

Any exception which may arise will be catched and shown the exception text.

head_folder

The folder is escaped to consider special characters.

The bucket object lr_bucket is instantiated giving the bucket name. After the method head_object is called, giving the folder name. HTTP status is returned.

```
METHOD head_folder.
  DATA: lv_folder TYPE string.
  DATA: lv_msg TYPE string.
  DATA: lv_xml TYPE string.
  DATA: lv_http_status TYPE i.
  DATA: lt_response_headers TYPE tihttpnvp.              "#EC NEEDED
  DATA: lr_bucket TYPE REF TO /rs3/cl_aws_s3_bucket.
  DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.

  TRY.
*       Escape for considering special characters in folder name
      lv_folder = /rs3/cl_http=>escape_url( p_folder ).
      CONCATENATE lv_folder '/' INTO lv_folder.

      CREATE OBJECT lr_bucket
        EXPORTING
          i_bucket_name = p_bucket
          i_dbg         = p_dbg.

      CALL METHOD lr_bucket->head_object
        EXPORTING
          i_object_name      = lv_folder
        IMPORTING
          e_http_status      = lv_http_status
          e_response_headers = lt_response_headers.

      lv_msg = /rs3/cl_http=>get_reason_by_status( lv_http_status ).
      WRITE:/ lv_http_status, lv_msg.

      IF lv_xml IS NOT INITIAL.
        /rs3/cl_xml_utils=>show_xml_in_dialog( lv_xml ).
      ENDIF.

    CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
      lv_msg = lr_cx_aws_s3->get_text( ).
      WRITE:/ lv_msg.
  ENDTRY.
ENDMETHOD.                    "head_folder
```

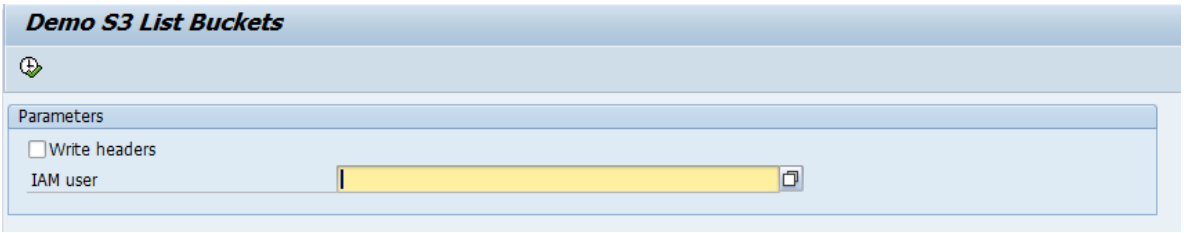
Any exception which may arise will be catched and shown the exception text.

Program /RS3/AWS_S3_DEMO_S3

Demo program /RS3/AWS_S3_DEMO_S3 shows how to operate on S3 service.

It lists the Buckets owned by the AWS account ID.

Selection screen:



Write headers parameter is to see the request and response headers.

Technical explanation

The only one operation on S3 is list buckets. It is implemented on static method list_buckets of local class lcl_demo_s3.

An object type /RS3/CL_AWS_S3 is instantiated, giving the IAM user.

After the method get_service is called. It returns an XML containing the list of the buckets the IAM has rights to access to.

```
CLASS lcl_demo_s3 IMPLEMENTATION.

  METHOD list_buckets.
    DATA: lr_s3 TYPE REF TO /rs3/cl_aws_s3.
    DATA: lv_response_content TYPE string.
    DATA: lr_cx_aws_s3 TYPE REF TO /rs3/cx_aws_s3.
    DATA: lv_exception_text TYPE string.
    TRY.
        CREATE OBJECT lr_s3
          EXPORTING
            i_user_name = p_iam
            i_dbg       = p_dbg.

        CALL METHOD lr_s3->get_service
          IMPORTING
            e_response_content = lv_response_content.

        CALL METHOD /rs3/cl_xml_utils=>show_xml_in_dialog
          EXPORTING
            i_xml = lv_response_content.

      CATCH /rs3/cx_aws_s3 INTO lr_cx_aws_s3.
        lv_exception_text = lr_cx_aws_s3->get_text( ).
        WRITE:/ lv_exception_text.
    ENDTRY.

  ENDMETHOD.                    "execute

ENDCLASS.                    "lcl_demo_bucket IMPLEMENTATION
```

Any exception which may arise will be catched and shown the exception text.

Uninstallation

In case you are not satisfied (**we hope not!**) and wish to uninstall AWS S3 SDK for ABAP Community edition we offer the possibility. You can download from Github the program ZUNINSTALL_S3_FOR_SAP. You can run this program to uninstall all /RS3/ objects. Note: This program has been tested on SAP Netweaver 7.50.

In order to improve our product we would be grateful if you can give us a feedback of the reasons why you were not satisfied.

Conclusion

You have installed and configured S3 for SAP, which is ready to be used.

You have demo programs as a reference for your developments.

In case you are interested in our services, as well as on the Commercial edition of AWS S3 for SAP feel free to contact with contact@linkeit.com

If you need support you can mail us at support@linkeit.com with subject “S3 for SAP”

You can also contact with Jordi Escoda, the developer of S3 for SAP at jordi.escoda@linkeit.com

We encourage downloading, installing and using AWS S3 SDK for ABAP Community edition.

Feel free to share and contribute, you can ask us in case you need any additional feature to improve the product.

Enjoy using S3 for SAP!