

# Alibaba Cloud Table Store

## Authorization

Issue: 20190319

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## Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 <b>Danger:</b> Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 <b>Warning:</b> Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 <b>Notice:</b> Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 <b>Note:</b> You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
<b>Bold</b>	It is used for buttons, menus, page names, and other UI elements.	Click OK.
Courier font	It is used for commands.	Run the <code>cd / d C :/ windows</code> command to enter the Windows system folder.
<i>Italics</i>	It is used for parameters and variables.	<code>bae log list --instanceid Instance_ID</code>
[ ] or [a b]	It indicates that it is an optional value, and only one item can be selected.	<code>ipconfig [-all -t]</code>

Style	Description	Example
<code>{}</code> or <code>{a b}</code>	It indicates that it is a required value, and only one item can be selected.	<code>switch {stand   slave}</code>



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# 1 RAM and STS

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Alibaba Cloud's permission management function includes Resource Access Management (RAM) and Security Token Service (STS). This function enables users to access Table Store through RAM user accounts with different permissions, and grant users temporary access authorization.

RAM is primarily used to control account system permissions over a long-term period. It allows you to assign different permissions to different RAM users created under your primary account to implement authorization management. For more information, see [RAM](#).

STS is a security credential (token) management system that grants temporary access permissions.

## Background

RAM and STS are designed to securely grant access to users without disclosing the primary account's AccessKey. Unintentional AccessKey disclosure poses serious account security risks as unauthorized users may freely operate the affected primary account, including malicious use of resources and theft of account information.

RAM provides permission control function used to allocate RAM users with different permissions to different entities, minimizing impact to a primary account if a RAM user's AccessKey is disclosed. Generally, RAM users are created for long-term account operations. Therefore, the AccessKeys of RAM users must not be disclosed.

In contrast to RAM's long-term control function, STS provides temporary access authorization by returning a temporary AccessKey and token, which can be used directly by temporary users to access Table Store. Generally, the permissions obtained from STS are more restrictive and only valid for a limited period of time.

## Basic concepts

Basic concepts related to RAM and STS are described as follows:

Concept	Description
RAM user	RAM users are created under an Alibaba Cloud primary account and assigned independent passwords and permissions, with each RAM user having its own AccessKey. RAM users can be used to perform authorized operations in the same way as the primary account. Generally, RAM users can be understood as users with certain permissions or operators with permissions for specified operations.
Role	A virtual concept indicating certain operation permissions, roles do not have independent logon passwords or AccessKeys. RAM users can assume roles, and the permissions that are granted when a role is assumed belong to this role. A role may be assumed by multiple users at the same time.
Policy	Policies are rules used to define permissions, such as the permissions to read or write certain resources.
Resource	Resources are the cloud resources that users can access, such as one or all instances of Table Store, or a certain table in an instance.

The relationship between a RAM user and its roles is similar to a relationship between an individual and their social identities in different scenarios. For example, a person can assume a role of employee in a company and assume a role of parent at home. Different roles are assigned corresponding permissions. The concept of employee or parent is not an actual entity able to take actions. Roles are complete only when being assumed by RAM users. Furthermore, a role may be assumed by multiple users at the same time. The user who assumes a role is automatically assigned all permissions of the role.

The following example provides more detailed information:

Assume that an Alibaba Cloud primary account named Alice has two Table Store instances named `alice_a` and `alice_b`. Alice has full permissions on both instances.

To maintain security of the primary account, Alice uses RAM to create two RAM users: Bob and Carol. Bob has the read and write permissions on `alice_a`, and Carol has the read and write permissions on `alice_b`. Bob and Carol both have their own `AccessKeys`. If the `AccessKey` of Bob or Carol is disclosed, only the corresponding instance is affected. Alice can then cancel the permissions of the compromised RAM user through the console.

If Alice needs to authorize another RAM user to read the tables in `alice_a`, instead of disclosing Bob's `AccessKey` to the user, Alice can create a role (for example, `AliceAReader`), and assign the role the read permission on `alice_a`. However, `AliceAReader` cannot be used directly as no `AccessKey` corresponds to this role.

To obtain temporary authorization, Alice can call STS's `AssumeRole` interface to inform STS that RAM user Bob wants to assume the role `AliceAReader`. If the interface is successfully called, STS returns a temporary `AccessKeyID`, `AccessKeySecret`, and `SecurityToken` as the access credentials. A temporary user assigned with these credentials obtains the temporary permission to access `alice_a`. The credentials' expiration time is specified when the `AssumeRole` interface is called.

#### RAM and STS best practices

RAM and STS are designed with complexity to achieve flexible permission control at the cost of simplicity.

RAM users and roles are two concepts used to separate the entity that performs operations from the virtual entity that represents a permission set. If a RAM user requires many permissions (including read and write permissions) but each operation only requires part of the total permission set, you can create two roles: one with the read permission and one with the write permission. Then create a user who does not have any permissions but can assume these two roles. When a RAM user needs to read or write data, the RAM user can temporarily assume the role with the required permission. In addition, roles can be used to grant permissions to other Alibaba Cloud users, making collaborations easier while maintaining strict account security.

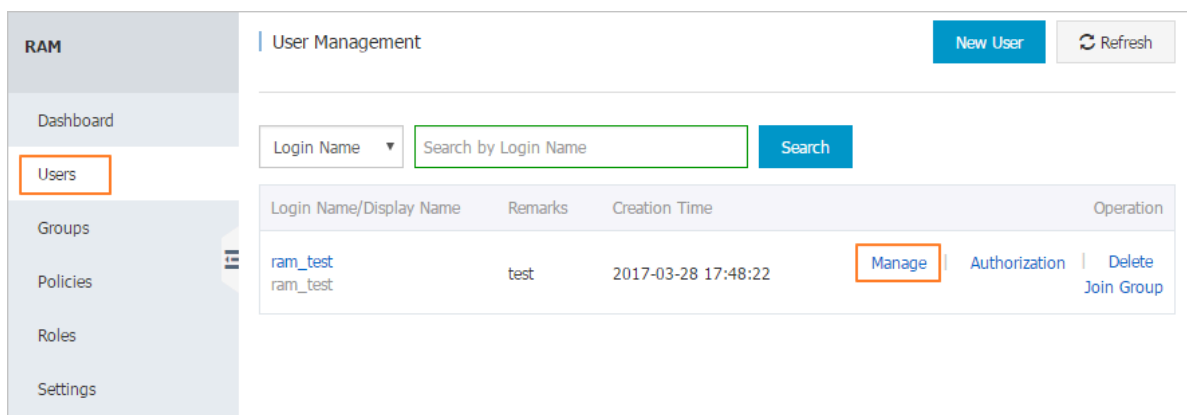
Implementing RAM or STS through the console and command line operations are strongly recommended to reduce the actual amount of codes that must be used. If code must be used to perform such operations, see the [RAM API Reference](#) and [STS API Reference](#).

## 2 RAM user access

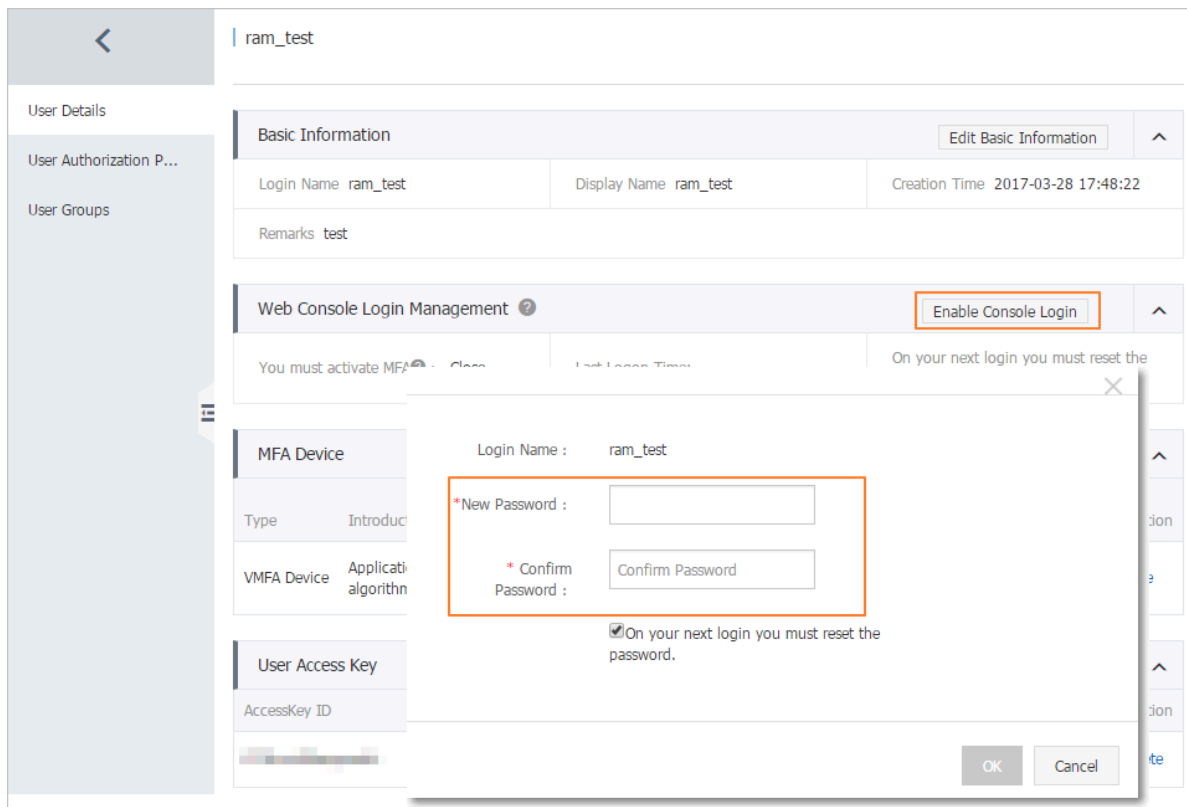
To maintain strict account security, use a RAM user to log on to the Table Store console for instance and table management. A RAM user can also be used to call the SDK interface and access data APIs.

Log on to the console

1. Log on to the [RAM console](#).
2. Click Users.



3. Select the required RAM user (this example uses ram\_test), and click Manage.
4. Click Enable Console Logon and reset the password.



5. Return to the User Management page and click Dashboard.
6. Click the RAM User Logon Link.
7. Enter the RAM user's user name and password set in step 4 to log on to the console.
8. Click Table Store to access the console..

#### Enable MFA

MFA (Multi-Factor Authentication) is a simple, effective method that provides additional security protection. When MFA is enabled, a 2-step security verification process is required through use of both a username and password to log on to the Alibaba Cloud console (first security factor), and a variable verification code provided by the MFA device (second security factor).

1. Use the primary account to log on to the [RAM console](#).
2. In the left-side navigation pane, click Users.
3. Locate the required RAM user, and click Manage.
4. On the User Details page, click Enable VMFA Device and follow the guide to enable the VMFA device.
5. Enable MFA.

After MFA is enabled, a MFA device verification code is required when logging on to the console.

#### Call an API

Create an AccessKey for the required RAM user and pass in this AccessKey when calling the SDK interface. The RAM user can then operate the same as the primary account.

## 3 STS temporary access authorization

---

This topic describes how to use STS to grant users temporary permissions for accessing Table Store to better restrict access permissions for short-term RAM user requirements.

Assume that a developer's app is used by multiple users, and each user is allowed to write data to instance `ram_test_app`. Data upload permissions must therefore be granted to these users, and the data stored by multiple users need to be separated.

To meet these requirements, use STS to grant users temporary access permission. The process is as follows.

### Create roles

1. Create a new RAM user named `ram_test_app` and do not grant it permissions. For RAM user creation details, see step 1 to step 7 in Use case.
2. Create two roles, `RamTestAppReadOnly` and `RamTestAppWrite`, to perform read operations and to upload files respectively.
  - a. Log on to the [RAM console](#).
  - b. Select Roles > Create Role.
  - c. Select User Role.
  - d. Enter the role information. Retain the default parameters and click Next.
  - e. Enter the role name `RamTestAppReadOnly` and click Create.
  - f. Click Close.
3. When created, the role does not have any permissions. To enable permissions, create a custom authorization policy.
  - a. Select Policies > Create Authorization Policy.
  - b. Select Blank Template.
  - c. Enter the Authorization Policy Name. For example: `ram-test-app-readonly`, and enter Policy Content as follows.

```
{
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ots:BatchGet*",
        "ots:Describe*",
        "ots:Get*",
```

```

"ots": {
  "List": {
    "Resource": [
      "acs:ots:*:*:instance/ram-test-app",
      "acs:ots:*:*:instance/ram-test-app/table/*"
    ]
  }
},
"Version": "1"
}

```

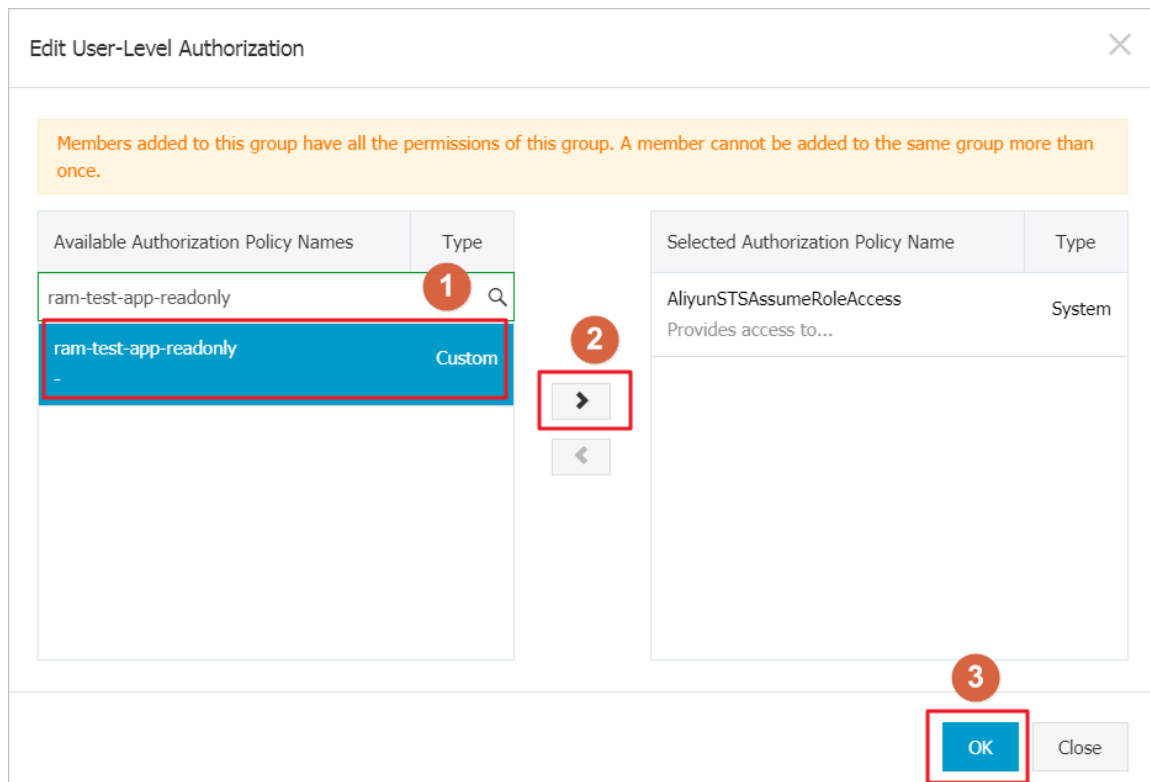
In the policy, the role is granted the read-only permission for ram-test-app.

d. Click Create Authorization Policy and then click Close.

4. Grant the role RamTestAppReadOnly the ram-test-app read-only permission.

a. Click Roles and click Authorize on the right side of role RamTestAppReadOnly.

b. Select ram-test-app-readonly and click  .



c. Click OK.

Role RamTestAppReadOnly has been granted the read-only permission for ram-test-app.

5. Follow the preceding steps to create another role called RamTestAppWrite, and grant this role the write permission for ram-test-app. The authorization policy is as follows.

```
{
```

```

" Statement ": [
  {
    " Effect ": " Allow ",
    " Action ": [
      " ots : Create *",
      " ots : Insert *",
      " ots : Put *",
      " ots : Update *",
      " ots : Delete *",
      " ots : BatchWrite *"
    ],
    " Resource ": [
      " acs : ots :*: instance / ram - test - app ",
      " acs : ots :*: instance / ram - test - app / table /*"
    ]
  }
],
" Version ": " 1 "
}

```

## Temporary access authorization

### • Preparations

Authorization is required for assuming roles, otherwise, any RAM users could assume these roles. To assume corresponding roles, a RAM user needs to have designated permissions explicitly configured. To create two policies and grant them to a RAM user (in this example, ram\_test\_app), follow these steps:

1. In the left-side navigation pane, click Policies.
2. Click Create Authorization Policy.
3. Select Blank Template.
4. Enter the Authorization Policy Name and Policy Content as follows.

#### - AliyunSTSAssumeRolePolicy2016011401

```

{
  " Version ": " 1 ",
  " Statement ": [
    {
      " Effect ": " Allow ",
      " Action ": " sts : AssumeRole ",
      " Resource ": " acs : ram : 198 *** 237 : role /
ramtestapp readonly "
    }
  ]
}

```

#### - AliyunSTSAssumeRolePolicy2016011402

```

{
  " Version ": " 1 ",
  " Statement ": [
    {
      " Effect ": " Allow ",

```



```


    " Action ": " sts : AssumeRole ",
    " Resource ": " acs : ram : 198 *** 237 : role /
ramtestapp write "
  }
]
}

```

**Note:**

The content entered after Resource is a role ID. To find the role ID, click **Manage** on the Roles page.

**5. Click Users.**

6. Find `AliyunSTSA ssumeRoleP olicy20160 11401` and `AliyunSTSA ssumeRoleP olicy20160 11402` , and click  to add them.

- Use STS

[Download STS command line tool Python.](#)

For more information about the call method and parameter description, see [STS Help Documentation](#).


```

$ python ./ sts . py AssumeRole RoleArn = acs : ram :: 198 ***
237 : role / ramtestapp readonly RoleSessionName = usr001
Policy = '{" Version ":" 1 "," Statement ": [{" Effect ":" Allow
"," Action ": [" ots : ListTable "," ots : DescribeTa ble "], "
Resource ": [" acs : ots :*:*: ram - test - app "," acs : ots :*:*:
ram - test - app /*" ] } ] }' DurationSeconds = 1000 -- id = id --
secret = secret

```

The parameters are described as follows:

Parameter	Description
RoleArn	The ID of the role to be assumed. A Role ID can be queried in Roles > Manage.
RoleSessionName	The name of a temporary credential . Generally, we suggest separating RoleSessionNames by different application users.

Parameter	Description
Policy	<p>An additional permission restriction added when the role is assumed.</p> <div>  <b>Note:</b>  Policy is used to restrict the temporary credential permissions after a role is assumed. Temporary credential permissions are the overlapping permissions of the role and the policy passed in. When a role is assumed, a policy can be passed in to improve flexibility. For example, when uploading files, you can add different uploading path restrictions for different users. </div>
DurationSeconds	<p>The validity period of the temporary credentials, measured in seconds. The minimum value is 900, and the maximum value is 3600.</p>
id and secret	<p>The AccessKey of the role to be assumed.</p>

- Test STS functions

Create a table named test\_write\_read on the [console](#). Set the primary key to name and the type to string. Use the Table Store CLI tool to test read and write operations.

In this example, the RAM user ram\_test\_app is used to access Table Store. In actual scenarios, replace the following AccessKey with your own AccessKey.

```
python2 . 7  ots_consol e -- url  https :// TableStore Test .
cn - hangzhou . ots . aliyuncs . com -- id  6iTlV1uhiY 71mlRt
-- key  clkkuDiq69 IJWJ7PnA9P XJxhRWMr3P
You cannot access the instance !
ErrorCode : OTSNoPermi ssionAcces s
ErrorMessa ge : You have no permission to access the
requested resource , please contact the resource owner
.
```

Without access permission, access attempts using the RAM user ram\_test\_app fail.

- Use temporary authorization to write data

In this example, the policy passed in is the same as the role policy. The expiration time is set to 3,600s, and SessionName is assumed as session001.

### 1. Use STS to obtain temporary credentials.

```
python2 . 7 ./ sts . py AssumeRole RoleArn = acs : ram
:: 198 *** 237 : role / ramtestapp write RoleSessionName
= session001 Policy = '{" Statement ": [{" Effect ": " Allow
", " Action ": [" ots : Create *", " ots : BatchWrite *", " ots
: Put *", " ots : Insert *", " ots : Update *", " ots : Delete
*"], " Resource ": [" acs : ots :*: instance / ram - test -
app ", " acs : ots :*: instance / ram - test - app / table /
*"] ] }', " Version ": " 1 "}' -- id = 6iTlVluhiY 71mlRt -- secret =
clkkuDiq69 IJWJ7PnA9P XJxhRWMr3P
{
  " AssumedRoleUser ": {
    " Arn ": " acs : ram :: 198 *** 237 : role / ramtestapp write
/ session001 ",
    " AssumedRoleId ": " 3306290527 49595885 : session001 "
  },
  " Credentials ": {
    " AccessKeyId ": " ***",
    " AccessKeySecret ": " ***",
    " Expiration ": " 2016 - 01 - 14T07 : 58 : 14Z ",
    " SecurityToken ": " CAESgAQIAR KAATDsbiB SujhVEHoMK
m1i17pyZhP TCe1BnVF5Y zdNyRos4Wu QjalxLkOE / hNNxg25vTo
9bljKg4VCc rfh6GkJNuJ MMcJ4V1i / 0RMDLFXwa0 / v0HP9W /
oSQpwAD5Ea WJfqVY / nxwmJ0aKJD HPmSieWssn lmoca0ZAgH
kpCqQSSDA8 GhhTVFMueD RnRzdLTXNm SGNrUWU4bL BLTE8iEjMz
MDYyOTA1Mj c00TU5NTg4 NSoGdXNyMD AxMPnChfjmj KjoGUnNhTU
Q1QuIBCgEx GtwBCgVBbG xvdXJnGxB Y3Rpb25FcX VhbHMSBkFj
dGlvbhpPCg tvdHM6Q3Jl YXRlKgoPb3 RzOkJhdGNo V3JpdGUqCg
hvdHM6UHV0 KgoLb3RzOk luc2VydCoK C290czpVcG RhdGUqCgtv
dHM6RGVsZX RlKhJqCg5S ZXNvdXJjZU VxdWFscxII UmVzb3VyY2
UaTgohYWNz Om90czoqOi o6aW5zdGFu Y2UvcnFtLX Rlc3QtYXBw
CilhY3M6b3 Rz0io6Kjpp bnN0YW5jZS 9yYW0tdGVz dC1hcHAvdG
FibGUvKkoQ MTk4MzQwNz U5Njk0NDIz N1IFMjY4ND JaD0Fzc3Vt
ZWRSb2xlvX NlcmAAahIz MzA2MjkwNT I3NDk1OTU4 ODVyD3JhbX
Rlc3RhchB3 cm10ZQ == "
  },
  " RequestId ": " 5F92B248 - F200 - 40F8 - A05A - C9C7D018E3 51 "
}
```

### 2. Use Table Store CLI tool to write data. (The Token parameter is supported by Table Store CLI tool v1.2.)

```
python2 . 7 ots_consol e -- url https :// TableStore
Test . cn - hangzhou . ots . aliyuncs . com -- id STS
. x4gG7KMsFH ckQe8nPKLO -- key IA6CJh5kE5 J5m8mR6aQX
WbMemSL63X h7SIhrEcke -- token = CAESgAQIAR KAATDsbiB
SujhVEHoMK m1i17pyZhP TCe1BnVF5Y zdNyRos4Wu QjalxLkOE /
hNNxg25vTo 9bljKg4VCc rfh6GkJNuJ MMcJ4V1i / 0RMDLFXwa0 /
v0HP9W / oSQpwAD5Ea WJfqVY / nxwmJ0aKJD HPmSieWssn lmoca0ZAgH
kpCqQSSDA8 GhhTVFMueD RnRzdLTXNm SGNrUWU4bL BLTE8iEjMz
MDYyOTA1Mj c00TU5NTg4 NSoGdXNyMD AxMPnChfjmj KjoGUnNhTU
Q1QuIBCgEx GtwBCgVBbG xvdXJnGxB Y3Rpb25FcX VhbHMSBkFj
dGlvbhpPCg tvdHM6Q3Jl YXRlKgoPb3 RzOkJhdGNo V3JpdGUqCg
hvdHM6UHV0 KgoLb3RzOk luc2VydCoK C290czpVcG RhdGUqCgtv
```

```
dHM6RGVsZX RlKhJqCg5S ZXNvdXJjZU VxdWFscxII UmVzb3VyY2
UaTgohYWNz Om90czoqOi o6aW5zdGFu Y2UvcnFtLX Rlc3QtYXBw
CilhY3M6b3 RzOio6Kjpp bnN0YW5jZS 9yYW0tdGVz dC1hcHAvdG
FibGUvKkoQ MTk4MzQwNz U5Njk0NDIz N1IFMjY4ND JaD0Fzc3Vt
ZWRSb2xlVX NlcmAAahIz MzA2MjkwNT I3NDk1OTU4 ODVyD3JhbX
Rlc3RhchHB3 cml0ZQ ==
```

```
OTS - TableStore Test >$ put test_write _read ' 001 ' age
: integer = 30
A new row has been put in table test_write
_read
```

- Use temporary authorization to read data

In this example, the policy passed in is the same as the role policy. The expiration time is set to 3,600s, and SessionName is assumed as session002.

### 1. Use STS to obtain temporary credentials.

```
python2 . 7 ./ sts . py AssumeRole RoleArn = acs : ram ::
198 *** 237 : role / ramtestapp readonly RoleSessionName =
session002 Policy = '{" Statement ": [{" Effect ": " Allow ",
Action ": [" ots : BatchGet *", " ots : Describe *", " ots : Get
*"," ots : List *"], " Resource ": [" acs : ots :*: instance /
ram - test - app ", " acs : ots :*: instance / ram - test - app
/ table /*"]}], " Version ": " 1 "}' -- id = 6iTLV1uhiY 71mLRt
-- secret = clkkuDiq69 IJWJ7PnA9P XJxhRWMr3P
{
  " AssumedRoleUser ": {
    " Arn ": " acs : ram :: 198 *** 237 : role / ramtestapp
readonly / session002 ",
    " AssumedRoleId ": " 3960257527 46614078 : session002 "
  },
  " Credentials ": {
    " AccessKeyId ": " ****",
    " AccessKeySecret ": " ****",
    " Expiration ": " 2016 - 01 - 14T08 : 14 : 16Z ",
    " SecurityToken ": " CAES6wMIAR KAAVtHeNgU nhk1320wDf
xZTu8gPQCx fakYLeWha / FxoEYNqBKQ TtyI4WPC5m pYuu8 + n +
yamSYTI2VP Q / z44fcYCNT1 bQ0km87F3n b6EJxVvCdJ IPNGVwQBmd
Ql / FLWBVhEGJ9 BIwog4fMzw hERjqnAP8H bynAIQpG55 BHaIXmv53x
+ GhhTVFMuMH FKMLVFOEFh bGNIZFE2bj JROFEiEjM5 NjAyNTc1Mj
c0NjYxNDA3 OCoKc2Vzc2 lvbjAwMjCo nMz5oyo6Bl JzYU1ENULG
AQoBMRrAAQ oFQWxs3cS SwoMQWN0aW 9uRXF1YWxz EgZBY3Rpb2
4aMwoNb3Rz OkJhdGNoR2 V0KgoNb3Rz OkRlc2NyaW JkgoIb3Rz
OkdldCoKCW 90czpMaXN0 KhJqCg5SZX NvdXJjZUVx dWFscxIIUm
Vzb3VyY2Ua TgohYWNzOm 90czoqOi o6 aW5zdGFuY2 UvcnFtLXRL
c3QtYXBwCi lhY3M6b3Rz Oio6Kjppbn N0YW5jZS9y YW0tdGVzdC
1hcHAvdGFi bGUvKkoQMT k4MzQwNzU5 Njk0NDIzN1 IFMjY4NDJa
D0Fzc3VtZW RSb2xlVXNL cmAAahIzOT YwMjU3NTI3 NDY2MTQwNz
hyEnJhbXRl c3RhchByZW Fkb25seQ == "
  },
  " RequestId ": " EE788165 - B760 - 4014 - 952C - E58ED229C8 0D "
}
```

- ### 2. Use the Table Store CLI tool to read data. (The Token parameter is supported by Table Store CLI tool v1.2.)

```
python2 . 7 ots_consol e -- url https :// TableStore
Test . cn - hangzhou . ots . aliynucs . com -- id STS
```

```
. 0qJ2UE8Aa1 cHdQ6n2Q8Q -- key pSaUjb809m U5M76nkC6F
Ht6wKwbCVY 027gxSEBAu -- token = CAES6wMIAR KAAVtHeNgU
nhk1320Wdf xZTu8gPQCx fakYLeWha / FxoEYNqBKQ TtyI4WPC5m
pYuu8 + n + yamSYTI2VP Q / z44fcYCNT1 bQ0km87F3n b6EJxVvCdJ
IPNGVwQBmd Ql / FLwBVhEGJ9 BIwog4fMzw hERjqnAP8H bynAIQpG55
BHaIXmv53x + GhhTVFmuMH FKMLVF0EFh bGNIZFE2bj JROFEiEjM5
NjAyNTc1Mj c0NjYxNDA3 OCoKc2Vzc2 lvbJAwMjCo nMz5oyo6Bl
JzYU1ENULG AQoBMRrAAQ oFQWxs3cS SwoMQWN0aW 9uRXF1YWxz
EgZBY3Rpb2 4aMwoNb3Rz OkJhdGNoR2 V0KgoNb3Rz OkRlc2NyaW
JlKgoIb3Rz OkdldCoKcW 90czpMaXN0 KhJqCg5SZX NvdXJjZUVx
dWFscxIIUm Vz3b3VyY2Ua TgohYWNzOm 90czoq0io6 aW5zdGFuY2
UvcMftLXRl c3QtYXBwCi lhY3M6b3Rz Oio6Kjppbn N0YW5jZS9y
YW0tdGVzdC 1hcHAvdGFi bGUvKkoQMT k4MzQwNzU5 Njk0NDIzN1
IFMjY4NDJa D0Fzc3VtZW RSb2xLVXNl cmAAahIzOT YwMjU3NTI3
NDY2MTQwNz hyEnJhbXRl c3RhchByZW Fkb25seQ ==

OTS - TableStore Test >: get test_write _read ' 001 '
age : INTEGER = ' 30 '
```

- Use temporary authorization to access the console

In the previous example, RAM user `ram_test_app` can assume role `RamTestAppReadOnly` to obtain the permission to view all instances and tables. The logon process is as follows:

1. Log on to the [RAM console](#) using the primary account.
2. Log on to the RAM console using the primary account.
3. Click RAM User Logon Link and log on using RAM user `ram_test_app`.
4. Click the RAM user name and click Switch Role.
5. Enter the enterprise alias and role name, and click Switch.

Use temporary authorization to call Java SDK

Create an `OTSClient` object, and pass in parameters of STS Token, including `AccessKeyId`, `AccessKeySecret`, and `Token`.

```
OTSClient client = new OTSClient(otsEndpoint, stsAccessKeyId, stsAccessKeySecret, instanceName, stsToken);
```

## 4 Customize permissions

### Action

Action is an API name that is used to specify APIs that are open or restricted for user access. When creating a Table Store authorization policy, add an `ots :` prefix for each Action and separate multiple Actions using commas. The asterisk (\*) wildcard is also supported (including prefix matching and suffix matching).

#### Typical Action

- Single API

```
" Action ": " ots : GetRow "
```

- Multiple APIs

```
" Action ": [
  " ots : PutRow ",
  " ots : GetRow "
]
```

- All read-only API

```
" Action ": [
  " ots : BatchGet *",
  " ots : Describe *",
  " ots : Get *",
  " ots : List *",
  " ots : ComputeSpl itPointsBy Size "
]
```

- All read and write API

```
" Action ": " ots :*"
```

### Resource

A Resource in Table Store is composed of multiple fields including product, region, user ID, instance name, and table name. Each field supports asterisk (\*) wildcard (including prefix matching and suffix matching).

The format is as follows:

```
acs : ots :[ region ]:[ user_id ]: instance /[ instance_n ame ]/
table /[ table_name ]
```

- The product is ots.
- [xxx] indicates a variable.

- The region is an abbreviation written in English, for example, cn-hangzhou. For more information about regions of service nodes, see [Region](#).
- The user ID is the Alibaba Cloud account ID.

**Note:**

Instance names are case-insensitive. However, you must use lower case letters for [ instance\_name ] in resource definition.

**Typical Resource**

- All resources of the users in all regions

```
" Resource ": " acs : ots :*:~:~:"
```

- All instances and their tables of user 123456 in China East 1 region

```
" Resource ": " acs : ots : cn - hangzhou : 123456 : instance /*"
```

- Instance abc and its tables of user 123456 in China East 1 region

```
" Resource ": [
  " acs : ots : cn - hangzhou : 123456 : instance / abc ",
  " acs : ots : cn - hangzhou : 123456 : instance / abc / table /*"
]
```

- All instances whose names begin with abc and their tables

```
" Resource ": " acs : ots :*:~:~: instance / abc *"
```

- All instances whose names begin with abc and their tables whose names begin with xyz (excluding instance resources, and not match acs:ots:~:~:instance/abc\*)

```
" Resource ": " acs : ots :*:~:~: instance / abc */ table / xyz *"
```

- All instances whose names end with abc and their tables whose names end with xyz.

```
" Resource ": [
  " acs : ots :*:~:~: instance /* abc ",
  " acs : ots :*:~:~: instance /* abc / table /* xyz "
]
```

**API types**

Table Store has two types of APIs

- Management APIs for reading from, and writing to, instances.
- Data APIs for reading from, and writing to, tables and rows.

The following table describes these APIs:

API/Action	API Type	Description
ListInstance	Management	Get instance list, called by console only
InsertInstance	Management	Create instance, called by console only
GetInstance	Management	Get instance meta, called by console only
DeleteInstance	Management	Delete instance, called by console only
ListTable	Data	Get table list, called by console or SDK
CreateTable	Data	Create table, called by console or SDK
UpdateTable	Data	Update table meta, called by console or SDK
DescribeTable	Data	Get table meta, called by console or SDK
DeleteTable	Data	Delete table, called by console or SDK
GetRow	Data	Read a record, called by SDK only
PutRow	Data	Insert a record, called by SDK only
UpdateRow	Data	Update a record, called by SDK only
DeleteRow	Data	Delete a record, called by SDK only
GetRange	Data	Readrange, called by SDK only
BatchGetRow	Data	Batch read records, called by SDK only
BatchWriteRow	Data	Batch write records, called by SDK only



- Resources accessed by management APIs

Management APIs are generally instance-related operations and can be called only on the console. The actions and resources definitions of management APIs determine subsequent use of the console. The prefix `acs : ots : [ region ] : [ user_id ] :` is omitted in the following accessed resources, leaving only the instance and table parts to be described.

API/Action	Resource Access
ListInstance	instance/*
InsertInstance	instance/[instance_name]
GetInstance	instance/[instance_name]
DeleteInstance	instance/[instance_name]

- Resources accessed by data APIs

Data APIs are generally table-related operations and can be called both on the console and by the SDK. The actions and resources definitions of data APIs determine subsequent use of the console. The prefix `acs : ots : [ region ] : [ user_id ] :` is omitted in the following accessed resources, leaving only the instance and table parts to be described.

API/Action	Resource Access
ListTable	instance/[instance_name]/table/*
CreateTable	instance/[instance_name]/table/[table_name]
UpdateTable	instance/[instance_name]/table/[table_name]
DescribeTable	instance/[instance_name]/table/[table_name]
DeleteTable	instance/[instance_name]/table/[table_name]
GetRow	instance/[instance_name]/table/[table_name]
PutRow	instance/[instance_name]/table/[table_name]
UpdateRow	instance/[instance_name]/table/[table_name]

API/Action	Resource Access
DeleteRow	instance/[instance_name]/table/[table_name]
GetRange	instance/[instance_name]/table/[table_name]
BatchGetRow	instance/[instance_name]/table/[table_name]
BatchWriteRow	instance/[instance_name]/table/[table_name]

- Limits

- In a policy, actions and resources are verified by string matching. When using the asterisk (\*) wildcard, prefix matching and suffix matching are distinguished. For example, if a resource is defined as `acs : ots :*: *: instance /*/`, then `acs : ots :*: *: instance / abc` cannot be matched. If a resource is defined as `acs : ots :*: *: instance / abc`, then `acs : ots :*: *: instance / abc / table / xyz` cannot be matched.
- To manage instance resources on the Table Store console, you must have permission to read the `acs : ots :[ region ]:[ user_id ]: instance /*` resource to obtain the instance list on the console.
- For Batch APIs (such as BatchGetRow and BatchWriteRow), the backend service performs authentication for each table being accessed. Operations can be performed only when authentication is successful for all tables. Otherwise, a permission error is returned.

## Condition

The policy supports multiple authentication conditions that are supported on all APIs of Table Store, including access IP address restriction, whether to access through HTTPS, whether to access through Multi-Factor Authentication (MFA), and access time restriction.

- Access IP address restriction

Resource Access Management can restrict the source IP addresses used to access Table Store, and filter IP addresses based on the network segment. The following are typical application scenarios:

- Multiple IP addresses are restricted. For example, only requests from 10.101.168.111 and 10.101.169.111 are allowed.

```
{
  "Statement ": [
    {
      "Effect ": " Allow ",
      "Action ": " ots :*",
      "Resource ": " acs : ots :*:~:~*",
      "Condition ": {
        "IpAddress ": {
          "acs : SourceIp ": [
            " 10 . 101 . 168 . 111 ",
            " 10 . 101 . 169 . 111 "
          ]
        }
      }
    }
  ],
  "Version ": " 1 "
}
```

- A single IP address is restricted. For example, only requests from 10.101.168.111 or 10.101.169.111/24 are allowed.

```
{
  "Statement ": [
    {
      "Effect ": " Allow ",
      "Action ": " ots :*",
      "Resource ": " acs : ots :*:~:~*",
      "Condition ": {
        "IpAddress ": {
          "acs : SourceIp ": [
            " 10 . 101 . 168 . 111 ",
            " 10 . 101 . 169 . 111 / 24 "
          ]
        }
      }
    }
  ],
  "Version ": " 1 "
}
```

- HTTPS access restriction

Resource Access Management can specify the use of HTTPS for access.

Access by requests only through HTTPS

```
{
```

```

    " Statement ": [
      {
        " Effect ": " Allow ",
        " Action ": " ots :*",
        " Resource ": " acs : ots :*:~:*~*",
        " Condition ": {
          " Bool ": {
            " acs : SecureTran sport ": " true "
          }
        }
      }
    ],
    " Version ": " 1 "
  }

```

- **MFA access restriction**

Resource Access Management can specify the use of MFA for access.

Access by requests only through MFA

```

{
  " Statement ": [
    {
      " Effect ": " Allow ",
      " Action ": " ots :*",
      " Resource ": " acs : ots :*:~:*~*",
      " Condition ": {
        " Bool ": {
          " acs : MFAPresent ": " true "
        }
      }
    }
  ],
  " Version ": " 1 "
}

```

- **Access time restriction**

Resource Access Management can specify the time to grant access by a request, that is, it can determine if access is allowed or rejected by requests only before a specified time. For example,

user access is allowed only before 00:00:00 January 1, 2016.

```

{
  " Statement ": [
    {
      " Effect ": " Allow ",
      " Action ": " ots :*",
      " Resource ": " acs : ots :*:~:*~*",
      " Condition ": {
        " DateLessThan ": {
          " acs : CurrentTime ": " 2016 - 01 - 01T00 :
00 : 00 + 08 : 00 "
        }
      }
    }
  ],
  " Version ": " 1 "
}

```

```
}
```

## Typical application scenarios

This section defines specific policies in typical scenarios and offers authorization methods.

- Multiple authorization conditions

In this scenario, users accessing the 10.101.168.111/24 network segment can read from and write to all instances named online-01 and online-02 (including all tables of these instances). A restrictive access policy means access is allowed only before 0:00:00 January 1, 2016 through HTTPS.


To grant policy permissions to a RAM user, follow these steps:

1. Use the primary account to log on to the [RAM console](#).
2. In the left-side navigation pane, click Policies.
3. In the upper-right corner, click Create Authorization Policy.
4. Select Blank Template.
5. Enter the Authorization Policy Name and copy the following content to Policy Content.

```
{
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "ots:*",
      "Resource": [
        "acs:ots:*:*:instance / online - 01 ",
        "acs:ots:*:*:instance / online - 01 / table /*",
        "acs:ots:*:*:instance / online - 02 ",
        "acs:ots:*:*:instance / online - 02 / table /*"
      ],
      "Condition": {
        "IpAddress": {
          "acs:SourceIp": [
            "10 . 101 . 168 . 111 / 24 "
          ]
        },
        "DateLessThan": {
          "acs:CurrentTime": "2016 - 01 - 01T00 : 00 : 00 + 08 : 00 "
        },
        "Bool": {
          "acs:SecureTransport": "true "
        }
      }
    }
  ],
  "Version": " 1 "
}
```

```
}

```

6. Click Create Authorization Policy and then click Close.
7. In the left-side navigation pane, click Users.
8. Locate the RAM user to be authorized, and click Authorize.
9. Select the policy created in the preceding steps, and click  .

10. Click OK.

#### · Reject requests

In this scenario, users accessing the IP address 10.101.169.111 are not allowed to write to all tables of instances in the Beijing region whose names begin with `online` and `product` . Operations related to instances are not involved.

To reject requests, first see the preceding steps to create a new policy and grant policy permissions to the designated RAM user. Then, during policy creation, copy the following content to Policy Content.

```
{
  "Statement": [
    {
      "Effect": "Deny",
      "Action": [
        "ots:Create*",
        "ots:Insert*",
        "ots:Put*",
        "ots:Update*",
        "ots>Delete*",
        "ots:BatchWrite*"
      ],
      "Resource": [
        "acs:ots:cn-beijing:*:instance/online*/table/*",
        "acs:ots:cn-beijing:*:instance/product*/table/*"
      ],
      "Condition": {
        "IpAddress": {
          "acs:SourceIp": [
            "10.101.169.111"
          ]
        }
      }
    }
  ],
  "Version": "1"
}
```

## 5 Use case

---

This section explains safe practices when configuring a RAM user for authentication processes. Assume your Alibaba Account has no RAM user, You must replace the default AccessKey with your own AccessKey.

### Create a subaccount

Assume you have a Table Store instance named ram-test-dev.

In this scenario, we do not recommend that you use the primary account to access an instance so as to avoid potential problems caused by unintentionally exposing the AccessKey and password.

### Procedure

1. Use the primary account to log on to the [RAM console](#).
2. In the left-side navigation pane, click Users.
3. Click Create User to create a RAM user. Designate it with the same Table Store access permissions as the primary account.

4. Click OK. The AccessKey for the new RAM user ram\_test is generated.

Create User

\* User Name :

ram\_test

The name can contain 1 to 64 characters, including lowercase letters a-z, uppercase letters A-Z, digits 0-9, and only these special characters: period (.), underscore (\_), and hyphen (-).

Display Name :

ram\_test

Display names must contain 1-128 characters. They may include Chinese characters, lowercase letters a-z, numbers 0-9, and these special characters: (@) (.) ( \_ ) ( - ).

Description :

☐ Automatically generate an Access key for this user.

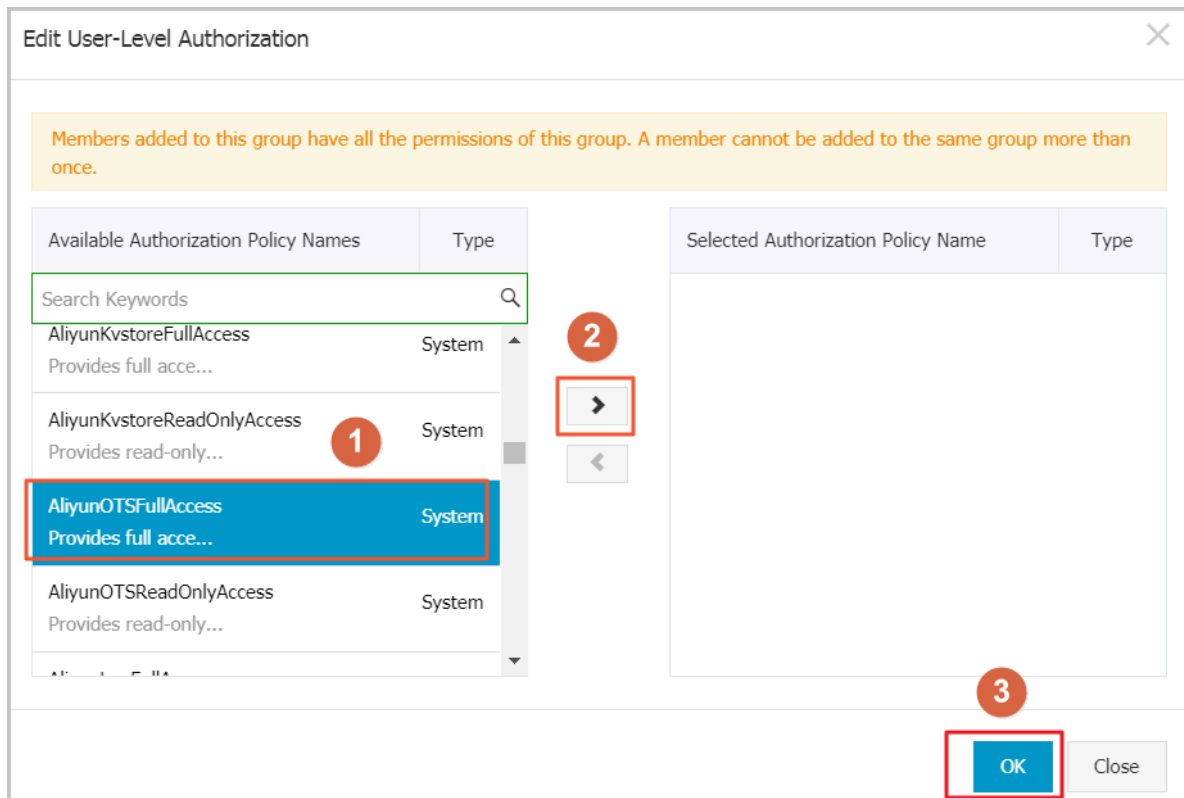
OK

Cancel

5. Save the AccessKey information.



## 6. Click Authorizeto grant the RAM user full access permissions for Table Store.



## 7. (Optional) Click Manage to grant the account console logon or other permissions.

### Example

In this example, the AccessKey is for ram\_test. In actual scenarios, replace it with your own AccessKey.

```
$ python ots_consol e -- url https :// TableStore Test . cn -
hangzhou . ots . aliyuncs . com -- id VPIzjuDB6T 4FGoWM -- key
r1usnIQ4Tw 1yI6bNJkKa y6A8EJoMvs

$ OTS - TableStore Test >: ct test pk1 : string , pk2 : integer
readrt : 1 writert : 1
Table test has been created successful ly .

$ OTS - TableStore Test >: dt test
You will delete the table : test !

press Y ( confirm ) : Y
Table test has been deleted successful ly .
```

The ram\_test subaccount can be used for all general operations, so as to avoid exposing the AccessKey of the primary account.

### Read/write permission separation

To share data of an instance in Table Store without data modification, you can separate read/write permission by creating a subaccount with read-only permission.

Create a RAM user named `ram_test_pub`. Select `ReadOnly` on the `Edit User-Level Authorization` page to grant the RAM user read-only access permission for Table Store.

Create User

\* User Name :

The name can contain 1 to 64 characters, including lowercase letters a-z, uppercase letters A-Z, digits 0-9, and only these special characters: period (.), underscore (\_), and hyphen (-).

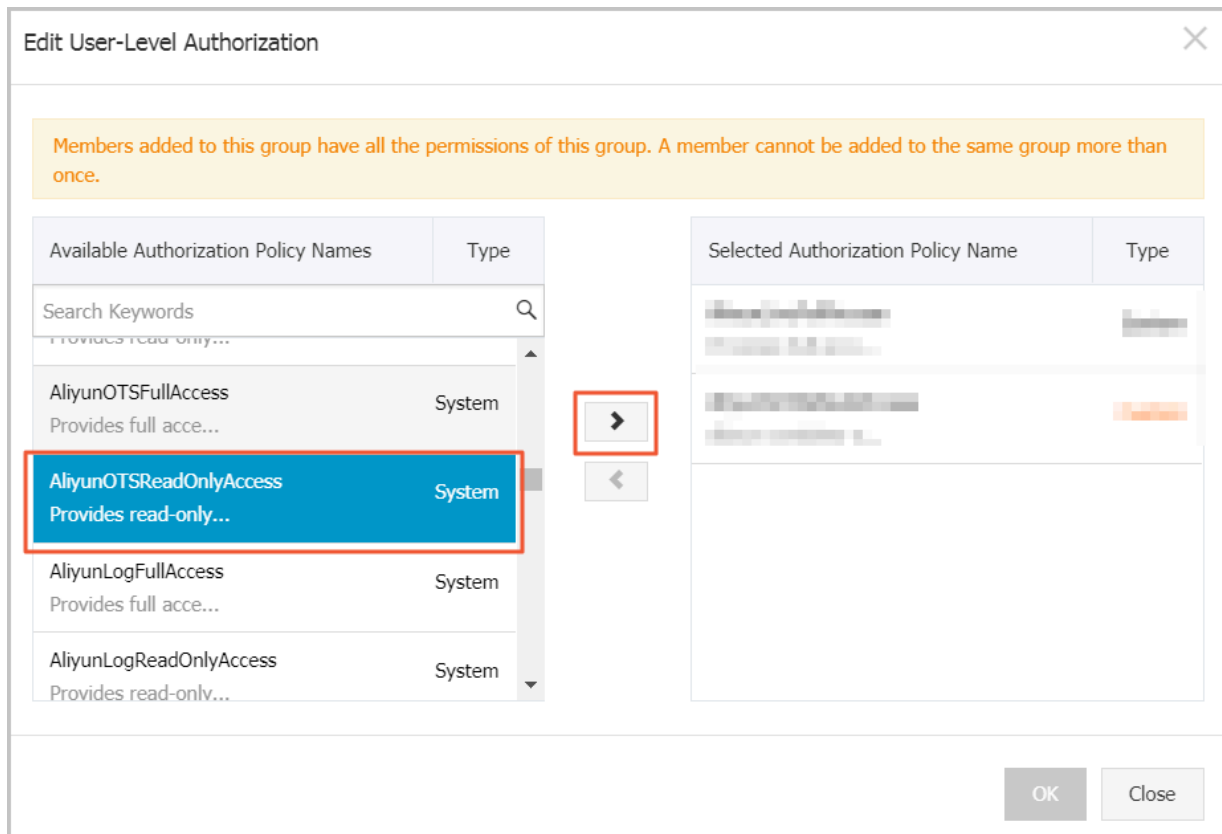
Display Name :

Display names must contain 1-12 characters. They may include Chinese characters, lowercase letters a-z, numbers 0-9, and these special characters: (@) (.) ( \_ ) ( -).

Description :

☒ Automatically generate an Access key for this user.

OK Cancel



### Example

Use the AccessKey of the RAM user to test the permissions of creating and deleting a table. In this example, the AccessKey is for ram\_test\_pub. In actual scenarios, replace it with your own AccessKey.

```
$ python ots_consol e -- url https://TableStoreTest.cn-hangzhou.ots.aliyuncs.com -- id ftWyMEYu1r BYTbWM -- key u4qR5IGu5x JsvS01y8mo yC6n5vA7af

$ OTS - TableStore Test >: ct test pk1 : string , pk2 : integer
readrt : 1 writert : 1
Fail to create table test .

$ OTS - TableStore Test >: dt test
You will delete the table : test !

press Y ( confirm ) : Y
Fail to delete table test .
```



#### Note:

Due to the read-only access permissions granted to RAM user ram\_test\_pub, it cannot be used to create or delete a table.