

Hybrid Cloud Monitoring Data Export Tool

1. Background

Some customers already have well-established enterprise IT management systems on-premises, including monitoring and operations systems, which are either self-built or use third-party monitoring solutions. These customers have a strong demand to export monitoring data in real time to their on-premises systems or third-party systems.

To address this requirement, CMS has developed the `Cloud Monitor Data Exporter`, which provides better support for real-time export of large-scale monitoring time-series data. This tool leverages the `Cursor` and `BatchExport` APIs provided by the Exporting Service, and based on user configuration, it continuously writes cloud monitoring data to the user's Prometheus instance in near-real-time way.

2. Quick Introduction

After enabling `Hybrid Cloud Monitoring`, customers need to:

1. Prepare an account with AK, SK and proper permissions,
2. Modify the configuration file,
3. Launch the tool,
4. Write monitoring data to Prometheus,
5. Complete monitoring via Grafana.

Through this article, you will learn about:

1. The required permissions for using the tool;
2. The structure and components of the tool;
3. How to run the tool;
4. How to modify the configuration file;
5. Reference documentation for CMS and Prometheus.

3. Prepare permissions

1. Activate service

Before using Hybrid Cloud Monitoring, customers need to activate the service. Please read this article for more information.

<https://www.alibabacloud.com/help/en/cms/cloudmonitor-1-0/hybrid-cloud-monitoring-1/>

2. Get monitoring data

- config main account AK in tool: no more specific permissions needed;
- config sub account AK in tool: at least `AliyunCloudMonitorReadOnlyAccess` should be granted to the sub account;

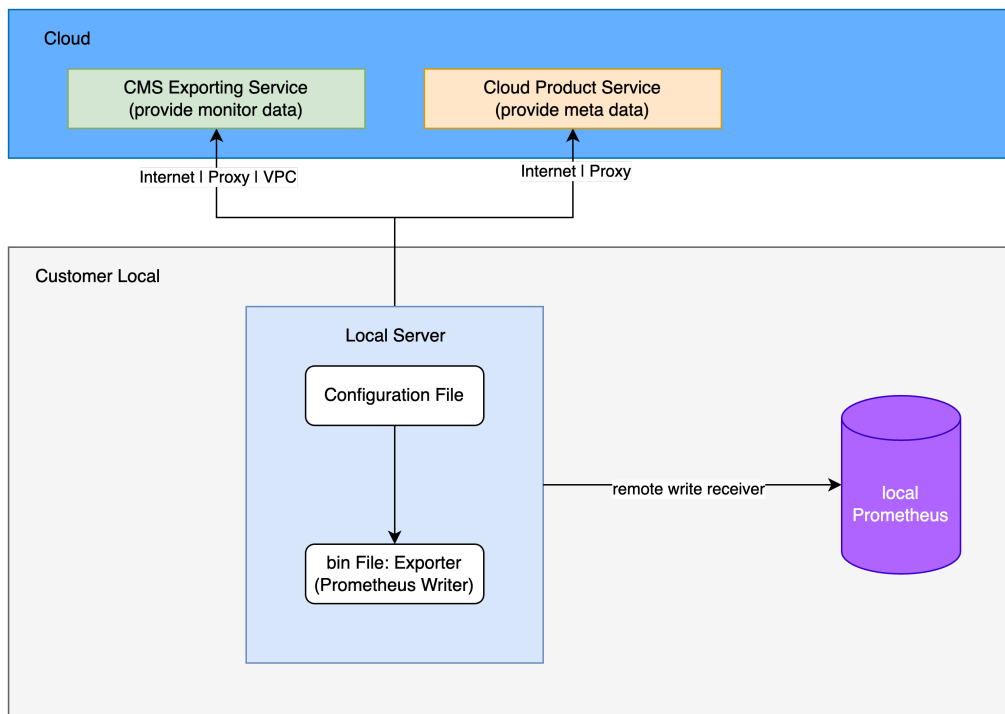
please note: In practice, we have observed that in certain customer scenarios, even after configuring the `AliyunCloudMonitorReadOnlyAccess` permission, the system may still fail to function properly or users are unable to configure this permission or policies. To accommodate these special cases, please refer to Section 8 ("Required RAM Permissions for the Tool") and manually configure the necessary permissions.

3. Write to Prometheus

When writing monitoring data to a remote Prometheus instance, ensure the following:

- Network Connectivity: The network where the exporter tool is located must be interconnected with the network hosting the Prometheus instance;
- Authentication Configuration: The system must support configuring `basic auth` credentials (username and password) for accessing the Prometheus instance.

4. Tool Structure



5. Detailed Instruction For The Configuration File

By reading the configuration file, exporter tool knows which product's monitoring data should be exported to Prometheus.

- consist of the tool:
 - a binary file, naming `exporter_local`
 - a configuration file, naming `product.yml`
 - default configuration file location:
 - current direcotory, `./configs/product.yml`
 - absolute path, `/home/cms/configs/product.yml`
 - priority of configuration file:
 - current directory is of higher priority;
 - if there is no configuration file in current directory, `/home/cms/configs/product.yml` will be read; if no file either, tool will report error and exit.
 - how to run the tool
- to run the tool, there is **no need** to specify the configuration file. The example is below:

```
$ chmod +x ./exporter_local
$ ./exporter_local
```

5.1 Configuration File Demo

Configuration file is written in yaml format, including 5 parts:

- tool params;
- prometheus instance address;
- user identity;
- custom tags;
- products and metrics to be exported.

```

# endpoint, configuration file location, log level, etc.
serverconf:
  service_endpoint: metrics.cn-shanghai.aliyuncs.com # endpoint
  port: 9123 # port
  page_size: 300 # query page size
  log_dest: 1 # 1 stdout; 2 file
  log_dir: # log location
  log_level: Info # log level
  http_proxy: # http proxy
  https_proxy: # https proxy
  no_proxy: # noproxy
  no_meta: true # whether to use meta feature
  no_savepoint: true # whether to save progress
  no_tag_prefix: true # whether to add 'tag_' prefix for

# remote Prometheus write address and auth
remote_prom:
  endpoint: http://localhost:9090/api/v1/write # Prometheus address
  basic_auth:
    username: xxxxxxxx # Prometheus instance basic auth username
    password: xxxxxxxx # Prometheus instance basic auth password

# user identity
credential:
  user_id: xxxxxxxx # main account id must
  access_key: xxxx # user's AK
  access_secret: xxxx # user's SK

# add to all monitoring data; if no need, just delete
datatag:
  - {key: xxxx, val: xxxx}
  - {key: xxxx, val: xxxx}

# products and metrics
products:
  - namespace: acs_ecs_dashboard # specify product namespace
    period: 60 # speicify global period; normally no need to config
    metric_info:
      - metric_list: [cpu_total] # metric list
        period: 15 # period for this group of metrics
        statistics: [Maximum] # statistics method for this group of metrics
  - namespace: acs_rds_dashboard
    metric_info:

```

- `metric_list`: [ConnectionUsage,CpuUsage,DiskUsage]
- `namespace`: acs_kvstore
`metric_info`:
 - `metric_list`: [ShardingCpuUsage,SplitrwCpuUsage,StandardCpuUsage]
- `namespace`: acs_slb_dashboard
`metric_info`:
 - `metric_list`: [ActiveConnection,DropConnection]
- `namespace`: acs_nat_gateway
`metric_info`:
 - `metric_list`: [BytesInFromInside,BytesInFromOutside]

5.2 Configuration File `serverconf` Part

Config the endpoint, query page size, server port and log level, etc.

Configuration Item	Type	Default Value	Details	Necessary
<code>service_endpoint</code>	string	empty string	used to set the service endpoint, as the default value is empty string; customer needs to provide a valid endpoint ,for more info, please refer to the cloud monitoring documentation.	yes
<code>port</code>	number	9123	used to set the server's port	no
<code>page_size</code>	number	5000	set query page size, valid range is <code>100~5000</code>	yes
<code>log_dest</code>	number	1	set the log location. <code>1</code> stands for the standard output; <code>2</code> stands for file	yes
<code>log_dir</code>	string	empty string	set the log directory. if empty, log file will be written to directories where bin file locates; if not empty, please make sure the directory is <code>writable</code>	no
<code>log_level</code>	string	empty string	set the log level. 1. log will be written only when it is heiger the set level;	no

Configuration Item	Type	Default Value	Details	Necessary
			<p>2. the valid level include: Trace, Debug, Info, Warning, Error, Fatal, Panic, with level increasing successively. for example, if set level to <code>Info</code>, only <code>Info</code>, <code>Warning</code>, <code>Errorf</code> log will be printed;</p> <p>3. log level is case sensitive and needs to be completely written;</p> <p>4. if not set, or leave empty, the defalut log level is <code>Info</code>.</p>	
<code>http_proxy</code>	string	empty string	set http_proxy.	no
<code>https_proxy</code>	string	empty string	set https_proxy.	no
<code>no_proxy</code>	string	empty string	set no_proxy	no
<code>no_meta</code>	bool	false	<p>whether to turn off the meta feature.</p> <p><code>true</code> for no meta info;</p> <p><code>false</code> for <code>will add meta</code></p>	no
<code>no_savepoint</code>	bool	false	<p>whether to turn off the save progress feature.</p> <p><code>true</code> for do not save progress;</p> <p><code>false</code> for <code>will save the progress</code></p>	no
<code>no_tag_prefix</code>	bool	false	<p>whether to turn off <code>add "tag_" prefix to tag</code> feature.</p> <p><code>true</code> for do not add "tag_" prefix;</p> <p><code>false</code> for <code>will add "tag_" prefix</code>.</p>	no

please note:

1. if the tool is stopped for more than 10min, the saved progress and cursor will be ignored. The tool will still to get the latest monitor data.This design targets to reach such a balance between maintaining the continuity of monitoring data and the need to obtain the latest monitoring data.

5.3 Configuration File `remote_prom` Part

Config the Prometheus write address and auth.

Configuration Item	Type	Default Value	Details	Necessary
<code>endpoint</code>	string	empty string	set the write address. As the default value is empty, customer needs to provide a valid address .To enable the write feature in Prometheus, <code>remote write receiver</code> switch should be set in starting parameters;for more info, please refer to Prometheus documents.	yes
<code>username</code>	string	empty string	only <code>basic auth</code> supported now, username for basic auth.	no
<code>password</code>	string	empty string	only <code>basic auth</code> supported now, password for basic auth.	no

5.4 Configuration File `credential` Part

Config the user identity.

Configuration Item	Value	Details	Necessary
<code>user_id</code>	user's ID	should be main account, which is like "1xxxx", "3xxx", "5xxxx", not sub account ID, which is like "2xxxx"	yes
<code>access_key</code>	user's ak	the AK should at least have the permission <code>AliyunCloudMonitorReadOnlyAccess</code> .	yes
<code>access_secret</code>	user's sk	the SK should at least have the permission <code>AliyunCloudMonitorReadOnlyAccess</code> .	yes

please note:

the least permission is not a guarantee for all the meta info.

5.5 Configuration File `datatag` Part

Config the customized `label` 和 `value` . Multi `label` can be configured.

Configuration Item	Type	Details
key	string	set the customized tag's key
val	string	set the customized tag's value

please not:

All monitor data will be add these tags

5.6 Configuration File `products` Part

Config products and metrics info.

Configuration Item	Type	Details	Necessary
<code>namespace</code>	string	specify the product, for example, <code>acs_ecs_dashboard</code> , <code>acs_rds_dashboard</code> , etc.; namespace is <code>case sensitive</code> , please refer to <code>CMS Metrics</code> for more infomation.	yes
<code>metric_list</code>	string array	specify the metrics, for example, <code>cpu_total</code> , <code>CPUUtilization</code> from <code>acs_ecs_dashboard</code> ; metric name is <code>case sensitive</code> , please refer to <code>CMS Metrics</code> for more information.	yes
<code>period</code>	number	1. specify the <code>period</code> of a metric and it cannot be set randomly . Only values valid can work; wrong period setting will fail the exporint process. 2. <code>namespace level</code> setting will be applied to all the products' metric; 3. <code>metric_list level</code> setting will be applied to current metric list; 4. if not set, <code>default period</code> will be used.	no

Configuration Item	Type	Details	Necessary
statistics	string array	<p>specify the statistics, for example, there are 3 monitor value, namely Average, Maximum, Minimum, for one monitor data point of metric <code>acs_ecs_dashboard/cpu_total</code> . By specifying which method, Average or Maximum, customer can get the proper monitor data value. Statistics is case sensitive , please refer to <code>CMS Metrics</code> for more information. Please note:</p> <ol style="list-style-type: none"> 1. if the statistics is not supported, no data will be exported; 2. setting will be applied to all metrics in <code>metric_list</code> ; 3. new tag <code>val_label="Average"</code> will be added to data; 	no

5.7 Config Identify in Environment Variables

The exporter tool supports configuring the user's identity information in the environment variables, which is more flexible to use the tool, and the configuration items and meanings are as follows.

Please note, **the configuration in the environment variables has a higher priority.**

Configuration Item	Value	Details	Necessary
CMS_EXPORTER_LOCAL_UID	set <code>user_id</code>	same as the <code>5.4 credential Part</code> , <code>user_id</code> configuration item	yes
CMS_EXPORTER_LOCAL_AK	set <code>access_key</code>	same as the <code>5.4 credential Part</code> , <code>access_key</code> configuration item	yes
CMS_EXPORTER_LOCAL_SK	set <code>access_secret</code>	same as the <code>5.4 credential Part</code> , <code>access_secret</code> configuration item	yes

6. Other Notes

1. Exporter tool will generate two files:

- `SavePoint.data` , used for save progress, please do not modify this file; if program stops too long, the file can be deleted, and the exporter will start exporting the latest data from now;
- `cms.log.yyyy-mm-dd_HH` , the log file, file split and rotate is not supported yet;

2. For the proxy setting:

- The `resource management group info` is one the meta info, and it's queried by `https` method. Therefore if meta is needed and proxy is used, the proxy setting should support `https` .

3. Why meta info needs internet access:

- origin monitor data usually only contains the instance id, but not the instance name, region and resource group info, all the these info are called `meta info` ;
- normally the meta info is stored in different region, while the monitor data is centralized. Therefore, in order to get all meta info in different regions, exporter tool needs to query by internet, which is not allowed in VPC.

7. Referenced Document

Docment	URL
1. CloudMonitor Introduction	https://www.alibabacloud.com/help/en/cms
2. Hybrid Cloud Monitoring	https://www.alibabacloud.com/help/en/cms/cloudmonitor-1-0/hybrid-cloud-monitoring
3. CMS Metrics	https://www.alibabacloud.com/help/en/cms/cloudmonitor-1-0/support/appendix-1-metrics
4. Hybrid cloud monitoring API	https://www.alibabacloud.com/help/en/cms/cloudmonitor-1-0/api-cms-2019-01-01-dir-hybrid-cloud-monitoring
5. exporting service endpoint	https://www.alibabacloud.com/help/en/cms/cloudmonitor-1-0/developer-reference/api-cms-2019-01-01-endpoint
6. Prometheus write feature	https://prometheus.io/docs/prometheus/latest/feature_flags/#remote-write-receiver

8. The RAM Permission Exporter Tool Needs

Product	RAM Permission
cms	cms:Cursor
cms	cms:BatchExport
cms	cms:Describe*
tag	tag:Describe*
tag	tag:List*
resourcemanager	resourcemanager:List*
k8s	cs:Get*
k8s	cs:Describe*
kafka	alikafka:List*
polardb	polardb:Describe*
bandwidthPackage, nat, physicalConn, ipv6, eip, etc.	vpc:Describe*
mongodb	dds:Describe*
rds	rds:Describe*
redis	kvstore:Describe*
slb	slb:Describe*
alb	alb:List*
nlb	nlb:List*
rocketmq	rocketmq:List*
elasticsearch	elasticsearch:List*
amqp	amqp:List*
oss	oss:Describe*
oss	oss:List*
oss	oss:Get*

Product	RAM Permission
cen	cen:Describe*
cen	cen:List*
lindorm	lindorm:Get*
lindorm	lindorm:List*
ens	ens:Describe*
polardb-x	polardbx:Describe*
polardb-x	drds:Describe*
clickhouse	clickhouse:Describe*
emr	emr:List*
nas	nas:Describe*

9. Meta Supported

Product	namespace	tag supported	instance name supported	resource management group info supported
ADB	acs_adb	√	-	√
ALB	acs_alb	√	√	√
AMQP	acs_amqp	√	√	√
API gateway	acs_apigateway_dashboard	√	-	-
Internet Shared Bandwidth	acs_bandwidth_package	√	√	√
CDN	acs_cdn	√	-	√
clickhosue (community)	acs_clickhouse(cc)	√	√	√

Product	namespace	tag supported	instance name supported	resource management group info supported
compatible edition)				
clickhosue (enterprise edition)	acs_clickhouse(ee)	√	√	√
CEN	acs_cen	-	√	-
CEN (Attachment)	acs_cen(attachment)	-	√	-
CEN (TR)	acs_cen(tr)	-	√	-
CEN (VBR)	acs_cen(vbr)	-	√	-
Anti-DDos Origin	acs_ddosbgp	√	-	√
Polardb-X	acs_drds	-	√	√
DTS	acs_dts	√	-	√
ECS	acs_ecs_dashboard	√	√	√
ElasticSearch	acs_elasticsearch	√	√	√
EMR	acs_emr	√	√	√
ENS	acs_ens	-	√	-
FC	acs_fc	√	-	-
Hbase	acs_hbase	√	-	-
Hbase Enhanced Edition	acs_hbaseue	-	-	√
Hologres	acs_hologres	√	-	-

Product	namespace	tag supported	instance name supported	resource management group info supported
IPv6 gateway (address)	acs_ipv6_bandwidth(address)	√	√	√
IPv6 gateway (gateway)	acs_ipv6_bandwidth(gateway)	√	√	√
k8s	acs_k8s	√	√	√
Kafka	acs_kafka	√	√	√
redis	acs_kvstore	√	√	√
lindorm	acs_lindorm	√	√	√
mongodb	acs_mongodb	√	√	√
Nas	acs_nas	√	√	√
NAT	acs_nat_gateway	√	√	√
NewBGP	acs_newbgpddos	√	-	√
NLB	acs_nlb	√	√	√
Oceanbase	acs_oceanbase	√	-	-
openAPI	acs_openAPI	√	-	-
OSS	acs_oss_dashboard	√	-	-
physical connection	acs_physical_connection	√	√	√
Polardb	acs_polardb	√	√	√
RDS	acs_rds_dashboard	√	√	√
RocketMQ	acs_rocketmq	√	√	√
SLB (CLB)	acs_slb_dashboard	√	√	√
Tair	acs_tair	√	√	√

Product	namespace	tag supported	instance name supported	resource management group info supported
EIP	acs_vpc_eip	√	√	√
VPN	acs_vpn	√	-	-
Waf	waf	-	-	√