Feed CA PM with Aggregated Metrics

A SNMP/CAMM Device Correlation Example

This document describes a sample use case to feed aggregated metrics back to CA PM using a custom CAMM device pack. The approach utilizes the SNMP/CAMM device correlation capability in CA PM 3.2.

Use Case: Aggregate Metrics

The aggregated bit volume per month should be reported as a growing trend chart and with the option to define a threshold monitor. In particular, bit counters from Interface metric family for a select number of interfaces on a device (all in a group) should be summarized to an aggregate value attached to same device every hour. The aggregated counter value should be reset to 0 at first day/first hour of a month.

Approach

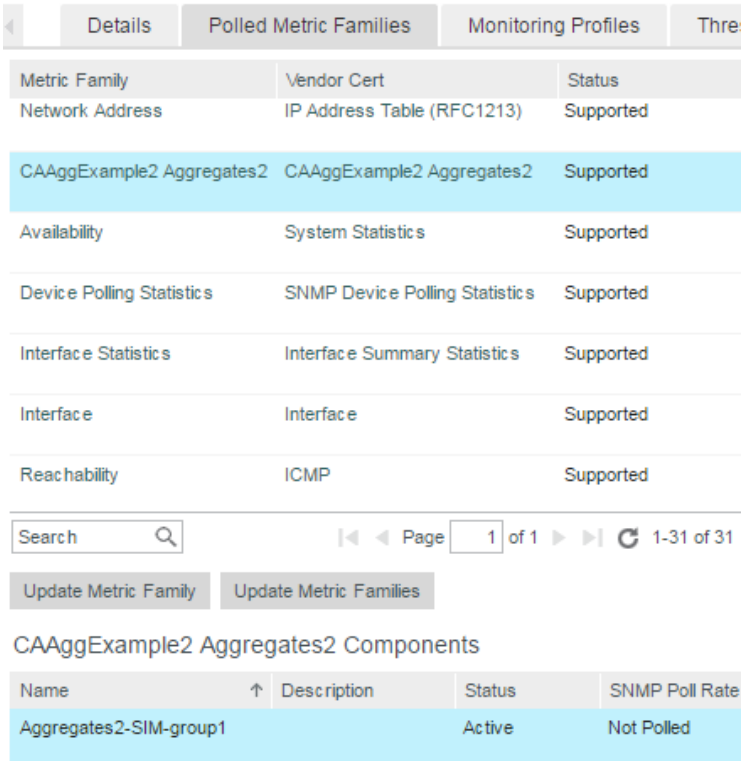
- SNMP monitoring for the device with Interface MF
- OpenAPI query to retrieve aggregated value at group level from interface metric
- OpenAPI query to retrieve current aggregated counter
- Bash shell script to run the queries and calculate new aggregated value
- CAMM custom device pack to collect aggregated value and feed into CA PM

Prerequisites

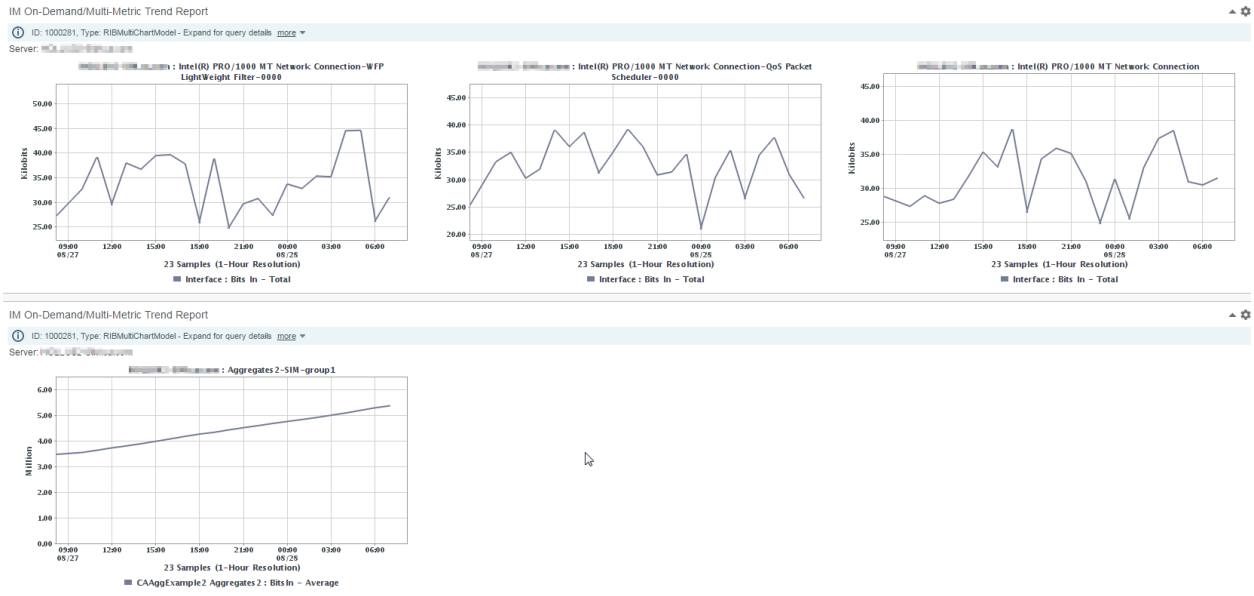
- CA PM 3.2
- Review of Device Correlation/Deduplication article and enablement https://docops.ca.com/ca-performance-management/3-2/en/building/manage-devices/device-deduplication
- CAMM 3.2 integrated with the CA PM system
- The Custom Device Pack (part of the provided example) has the following characteristics:
    - Inventory_conversion.xq must publish the IP Address using a new tag, e.g. `element DATA-Device.IPAddresses { concat('[', $obj/IPAddress/text(), ']') },`
    - *InventoryListUpdateFunction* must not be called as it will filter DATA- elements. Typically, the FILTER acquisition branch may be obsolete in *Inventory.xml*
    - In the generated inventory cammxml there must be an element like `<DATA-Device.IPAddresses>[10.0.0.1]</DATA-Device.IPAddresses>`
    - NOTE: the tag `TIM-deviceIP` is NOT used for device correlation
    - NOTE: the generic CSV Engine (CSV2CammXml-Plugin) does not yet support the new tag
- Bash shell script (like provided example) that calls OpenAPI queries and generates input file for the CAMM engine (part of this example)
- A Linux script host to host the bash shell script for execution on an hourly basis. It requires network access to the Data Aggregator port 8581 for OpenAPI query and must be reachable by sftp from the CAMM LC that hosts the custom device pack engine.

Example

Device supports a mix of standard metric families backed by SNMP vendor certs as well as a custom metric family that reflects the CAMM device pack for the aggregation



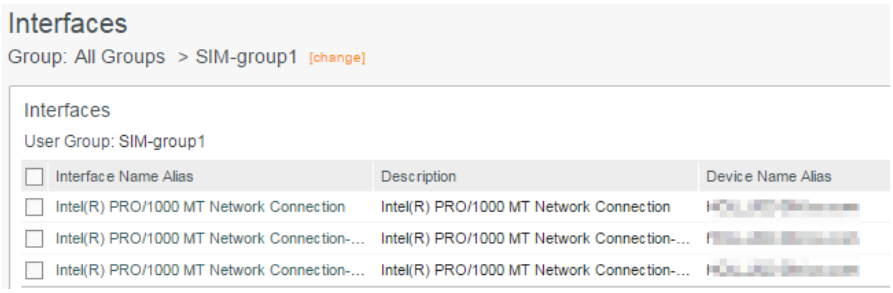
Context page visualizes individual interface metrics (SNMP) and the aggregated metric (CAMM)



Elements

1. CA PC Group

   Group (GROUPNAME) with interfaces of interest from device (DEVICENAME, DEVICEIP)



2. OpenAPI queries
   - Get the BitsIn SUM for all interfaces in the group for the last hour

     http://DA:8581/odata/api/groups?$apply=aggregate(portmfs(im_BitsIn with sum as Value))&$format=text/csv&&resolution=RATE&period=1h&$select=Name,MemberCount&$filter=((Name eq 'GROUPNAME'))
   - Get the aggregated counter value

     http://DA:8581/odata/api/devices?&resolution=RATE&period=1h&$expand=aggregates2mfs&$select=Name,aggregates2mfs/Timestamp,aggregates2mfs/im_BitsIn&$filter=((startswith(Name, 'DEVICENAME') eq true))

3. Bash shell script: aggCounter.sh
   - Runs both OpenAPI queries via curl
   - Parses query output and adds group counter to aggregate counter
   - Creates CSV datafile with new aggregated counter value for consumption by CAMM engine

```
1  Timestamp,Device,IPAddress,Group,BitsIn
2  1503993964,DEVICENAME,DEVICEIP,GROUPNAME,7579568
```

4. Crontab entry
   - Call aggCounter.sh script every hour at x:05 minutes

5. Custom Device Pack Engine: ENGINE_CAAggExample2
   - Inventory and performance configuration to process CSV with single metric: BitsIn
   - Inventory CAMMXML

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <root id="Inventory" deviceType="CAAggExample2" timestamp="1503994055" pollId="ENGINE_CAAggExample2-1503994054865">
3    <group>
4      <TIM-Device>DEVICENAME</TIM-Device>
5      <TIM-deviceIP></TIM-deviceIP>
6      <DATA-Device.IPAddresses>[DEVICEIP]</DATA-Device.IPAddresses>
7      <TIM-Branch>Aggregates2</TIM-Branch>
8      <TIM-BranchDescr>GROUPNAME</TIM-BranchDescr>
9      <TIM-utc>1503994055</TIM-utc>
10     <TIM-Delta>3600</TIM-Delta>
11   </group>
12 </root>
```

- Performance CAMMXML

```
<?xml version="1.0" encoding="UTF-8"?>
<root deviceType="CAAggExample2">
    <group>
        <TIM-Device>DEVICENAME</TIM-Device>
        <TIM-deviceIP/>
        <TIM-Branch>Aggregates2</TIM-Branch>
        <TIM-BranchDescr>GROUPNAME</TIM-BranchDescr>
        <TIM-utc>1502193660</TIM-utc>
        <TIM-Delta>3600</TIM-Delta>
        <DATA-BitsIn>79200</DATA-BitsIn>
    </group>
</root>
```

6. Custom PM Cert: CERT_CAAggExample2
    - DeviceMapper, Component, MetricFamily and VendorCert definitions for CA PM

7. Visualization
   Trend report in CA PC, e.g. on device context page

Installation

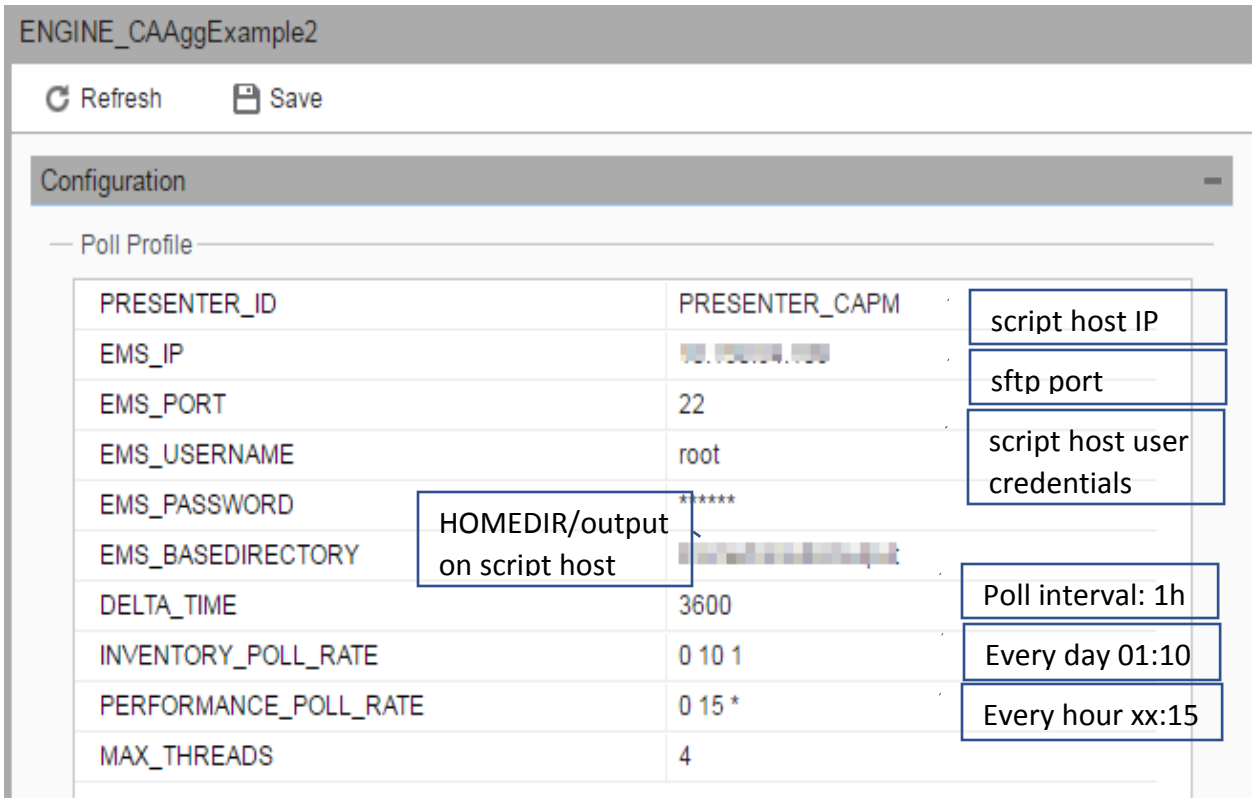
1. Preparations
    - Ensure the prerequisites are met (CA PM, deduplication enabled, CAMM, script host)
    - Identify the device(s) and interfaces to aggregate
    - Create interface groups accordingly
2. Unzip the installer archive to any directory on your local workstation
3. Script installation:
    - Copy aggCounter.sh script to a directory of choice (HOMEDIR) on Linux script host
    - Edit script file to set key parameters HOMEDIR, CRED, DA, GROUPNAME, AGGHOST, AGGIP

```
## INPUT PARAMETERS: set variables ========================
HOMEDIR=/home/user              # script directory
GROUPFILE=groupPM.csv           # odata query output
AGGFILE=aggregatePM.csv         # odata query output
# setup credentials user/pw
CRED='admin:admin'
DA='DAHOST'
GROUPNAME='GROUPNAME'           # interface group name
AGGHOST='DEVICENAME'            # aggregate device name
AGGIP='DEVICEIP'                # aggregate device IP
## INPUT PARAMETERS: set variables ========================
```

- After verification of the script, add crontab entry

```
5 * * * * /home/user/aggCounter.sh >> /home/user/aggCounter.log 2>&1
```

4. CAMM DP deployment in CAMM Web user interface:
   - install CERT_CAAggExample2.zip
   - install ENGINE_CAAggExample2.zip on the desired LC
   - configure ENGINE_CAAggExample2



   - Start ENGINE_CAAggExample2

Verifications

1. run aggCounter.sh script manually and verify output in files groupPM.csv, aggregatePM.csv and dataXXX.csv
2. verify CAMM devicepack:
    - review engine log file in CAMM Web UI for errors
    - stop PRESENTER_CAPM and manually trigger an inventory poll. Then, on the LC machine with PRESENTER_CAPM, verify inventory cammxml file in /opt/CA/CAMM/Queue/queue-PRESENTER_CAPM/queue
    - trigger a performance poll and verify performance cammxml as above
3. verify CA PM certification elements exist
    - http://DA:8581/typecatalog/devmapper/CAAggExample2_DeviceMapping
    - http://DA:8581/typecatalog/components/Aggregates2
    - http://DA:8581/typecatalog/metricfamilies/NormalizedAggregates2Info
    - http://DA:8581/typecatalog/certifications/camm/CAAggExample2_Aggregates2
4. Verify DC processes CAMM data
   ems.log file in /opt/IMDataCollector/apache-karaf-2.4.3/data/log should have “processed” log entries for MediationCenter/Queue.Inv and MediationCenter/Queue.Pol cammxml files
5. If needed, force inventory and performance poll in CAMM web interface.
6. Verify Device List in CAMM web interface.
7. After a couple of successful polls, verify CAAggExample2 is listed under “Polled Metric Families” on CA PM DA Admin Page for the device
8. Verify aggregated data in CA PC trend report (e.g. on device context page, as described above)