



APPENDIX **A**

Code Samples

This appendix contains samples of files used to configure the Cisco Collection Manager.

The following sections includes file samples for the database table configuration file, the DTD file, the RAG adapter configuration file, and the custom adapter configuration file:

- [Application Configuration, page A-2](#)
- [RAG Adapter Configuration, page A-5](#)
- [Custom Adapter Configuration, page A-10](#)

Application Configuration

The following sections shows part of the XML file **dbtables.xml** used to configure the database tables, and the DTD file used to verify the structure of the XML file.

- [The dbtables.xml File, page A-2](#)
- [The tables.dtd File, page A-3](#)

The dbtables.xml File

The following code is a section of the Cisco SCA BB **dbtables.xml** file:

```
<?xml version="1.0" encoding="ISO8859_1"?>
<!DOCTYPE dbtabconf PUBLIC "-//P-Cube//Engage DB RDR Configuration 2.1.0//EN"
"dbtables.dtd">
<dbtabconf>
  <fileversion>
    ...
  </fileversion>
  <application name="Engage" version="2.1"/>
  <dbtables>
    <rdr name="SUR" dbtabname="RPT_SUR" tag="4042321922" createtable="true">
      <fields>
        <field id="1" name="TIME_STAMP" type="TIMESTAMP">
          <options>
            <option property="source" value="timestamp"/>
          </options>
        </field>
        <field id="2" name="RECORD_SOURCE" type="INT32">
          <options>
            <option property="source" value="recordsource"/>
          </options>
        </field>
        <field id="3" name="SUBSCRIBER_ID" type="STRING" size="64"/>
        <field id="4" name="PACKAGE_ID" type="INT16"/>
        <field id="5" name="SUBS_USG_CNT_ID" type="UINT16"/>
        <field id="6" name="MONITORED_OBJECT_ID" type="INT16"/>
        <field id="7" name="BREACH_STATE" type="UINT8"/>
        <field id="8" name="REASON" type="UINT8"/>
        <field id="9" name="CONFIGURED_DURATION" type="UINT32"/>
        <field id="10" name="DURATION" type="UINT32"/>
        <field id="11" name="END_TIME" type="INT32"/>
        <field id="12" name="UPSTREAM_VOLUME" type="INT32"/>
        <field id="13" name="DOWNSTREAM_VOLUME" type="INT32"/>
        <field id="14" name="SESSIONS" type="UINT16"/>
        <field id="15" name="SECONDS" type="UINT16"/>
        <field id="16" name="OS_FINGER_PRINTING" type="STRING" size="64"/>
        <!-- FIELD ADDED FOR IPV6 SUPPORT -->
        <field id="17" name="IP_TYPE" type="UINT8"/>
      </fields>
      <indexes>
        <index name="RPT_SUR_I1" columns="END_TIME">
          <options>
            <option property="clustered" value="true"/>
            <option property="allowduprow" value="true"/>
          </options>
        </index>
      </indexes>
    </rdr>
    <rdr name="LUR" dbtabname="RPT_LUR" tag="4042321925" createtable="true">
```

```

<options>
  <option property="tablespace" value="tspacel"/>
</options>
<fields>
  <field id="1" name="TIME_STAMP" type="TIMESTAMP">
  <!-- (other field declarations) -->
  <field id="10" name="DOWNSTREAM_VOLUME" type="UINT32"/>
  <field id="11" name="SESSIONS" type="UINT32"/>
</fields>
<indexes>
  <index name="RPT_LUR_I1" columns="END_TIME">
    <options>
      <option property="clustered" value="true"/>
      <option property="allowduprow" value="true"/>
      <option property="tablespace" value="tspace2"/>
    </options>
  </index>
</indexes>
</rdr>
<aggtable name="TOP_HOURLY" dbtabname="RPT_TOPS_PERIOD0" aggperiod="0">
  <fields>
    <field id="1" name="RECORD_SOURCE" type="INT32"/>
    <field id="2" name="METRIC_ID" type="INT8"/>
    <field id="3" name="SUBS_USG_CNT_ID" type="INT8"/>
    <field id="4" name="TIME_STAMP" type="TIMESTAMP"/>
    <field id="5" name="AGG_PERIOD" type="INT8"/>
    <field id="6" name="SUBSCRIBER_ID" type="STRING" size="64"/>
    <field id="7" name="CONSUMPTION" type="UINT32"/>
    <field id="8" name="PACKAGE_ID" type="INT16"/>
    <!-- FIELD ADDED FOR IPV6 SUPPORT -->
    <field id="9" name="IP_TYPE" type="INT8"/>
  </fields>
  <indexes>
    <index name="RPT_TOPS_PERIOD0_I1" columns="TIME_STAMP">
      <options>
        <option property="clustered" value="true"/>
        <option property="allowduprow" value="true"/>
      </options>
    </index>
  </indexes>
</aggtable>

```

For each table (either an RDR table, an aggregation table, or an extra table), the fields, indexes, and so on, are listed.


Note

A table, an index, or fields can have arbitrary free text options that can be accessed in the templates.

The XML file is verified at runtime against a simple DTD, which is reproduced in the following section.

The tables.dtd File

The following code represents the DTD file used to verify the **dbtables.xml** definition file:

```

<?xml version="1.0" encoding="ISO8859_1"?>

<!ELEMENT dbtabconf (fileversion, application, db?, dbtables)>
<!ELEMENT fileversion (#PCDATA)>
<!ELEMENT application EMPTY>
<!ATTLIST application
  name CDATA #REQUIRED

```

```

    version CDATA #REQUIRED
  >
  <!ELEMENT db (options)>
  <!ELEMENT dbtables (rdr*, aggtable*, table*)>
  <!ELEMENT table (options?, fields, indexes?)>
  <!ATTLIST table
    name CDATA #REQUIRED
    dbtabname CDATA #REQUIRED
    createtable (true | false) "true"
    inserttodb (true | false) "false"
  >
  <!ELEMENT aggtable (options?, fields, indexes?)>
  <!ATTLIST aggtable
    name CDATA #REQUIRED
    dbtabname CDATA #REQUIRED
    aggperiod CDATA #REQUIRED
    createtable (true | false) "true"
  >
  <!ELEMENT rdr (options?, fields, indexes?)>
  <!ATTLIST rdr
    name CDATA #REQUIRED
    dbtabname CDATA #REQUIRED
    tag CDATA #REQUIRED
    createtable (true | false) "true"
    inserttodb (true | false) "true"
  >
  <!ELEMENT fields (field+)>
  <!ELEMENT field (options?)>
  <!-- the id attribute below is presumably a numeric index, but it is for future
       use, we currently don't look at it, as the order is imposed in the XML -->
  <!ATTLIST field
    id CDATA #REQUIRED
    name CDATA #REQUIRED
    type CDATA #REQUIRED
    size CDATA #IMPLIED
  >
  <!ELEMENT indexes (index+)>
  <!ELEMENT index (options?)>
  <!ATTLIST index
    name CDATA #REQUIRED
    columns CDATA #REQUIRED
    create (true | false) "true"
  >
  <!ELEMENT options (option+)>
  <!ELEMENT option EMPTY>
  <!ATTLIST option
    property CDATA #REQUIRED
    value CDATA #REQUIRED
  >

```

You can set the location and name of the DTD and XML files separately for each adapter, in the adapter configuration file.

RAG Adapter Configuration

The following sections shows the configuration file (**ragadapter.conf**). It also shows the associated XML files used to configure the RAG adapter.

The configuration files of the other adapters are similar to the RAG adapter configuration file. Note that only the RAG adapter has associated XML files.

- [The ragadapter.conf File, page A-5](#)
- [ragadapter.xml File, page A-6](#)
- [The http_TURs.xml File, page A-6](#)
- [The video_TURs.xml File, page A-7](#)
- [The vlink_BW_per_pkg.xml File, page A-8](#)
- [The vsa_SURs.xml File, page A-8](#)
- [The cdma_SURs.xml file, page A-9](#)

The ragadapter.conf File

To perform general maintenance of the RAG adapter, use the `~scmscm/cm/config/ragadapter.conf` file. The following example represents the RAG adapter configuration file:

```
#
# RAGAdapter main configuration file
#
[config]
xml_conf_dir = ~/cm/config/ragadapter
domain_ext_filename = ~/cm/config/tlds-alpha-by-domain.txt
network_type_filename = ~/cm/config/rat-networktype.txt
imei_lookup = false
vsa_type=gsm
meid_length=8
attr_index=17
attr_shift_pos=0

[housekeeper]
interval_sec = 10

[db]
operations_timeout = 60
batch_size = 10
transaction_size = 15
commit_interval = 6
blocking_connects = true
db_template_file = main.vm
db_template_dir = dbpacks/sybase/ase12.5.1
#db_template_dir = dbpacks/sybase/ase12.5.1
#db_template_dir = dbpacks/oracle/9204e
#db_template_dir = dbpacks/mysql/4.0.20

[app]
app_conf_file = dbtables.xml
app_dtd_file = dbtables.dtd
app_conf_dir = apps/scasbb/latest

[bench]
rate_period_msec = 5000
```

ragadapter.xml File

The following **ragadapter.xml** file sample defines the sinks to persist the aggregated data. The sink section specifies the format of the aggregated data store and location to which the data is written (a CSV file or the database).

The CSV file definition is located in the **<sinks>** section under the **<csvsink id="csv1">** tag. This definition specifies the output file name and directory. It also specifies the rate at which new files are opened, either every 5 minutes, or when the current file reaches 1000 lines. Each field in the file is enclosed by quotes (").

The database definition is located in the **<sinks>** section under the **<dbsink id="dbsink1">** tag. If the sink is configured as a database, the aggregated data is written to the database configured in Collection Manager.

```
<?xml version="1.0" standalone="no"?>
<!--!DOCTYPE ragadapterconf SYSTEM "cm/config/ragadapter/ragadapterconf.dtd"-->
<ragadapterconf>
  <description>RAG Adapter basic configuration</description>
  <config>
    <aggregations/>
    <sinks>
      <csvsink id="csv1"
        classname="com.cisco.scmscm.adapters.rag.sinks.CSVSink"
        filenameformat="yyy-MM-dd_HH-mm-ss-SSS'.csv'"
        dirname="~/cm/adapters/RAGAdapter/csvfiles"
        maxagesec="300" maxlines="1000" usequotes="true" active="false"/>
      <dbsink id="dbsink1"
        classname="com.cisco.scmscm.adapters.rag.sinks.JDBCSink" active="true"/>
    </sinks>
  </config>
</ragadapterconf>
```

The http_TURs.xml File

The following sample represents a portion of the **http_TURs.xml** file, which defines aggregations for the incoming HTTP Transaction Usage RDRs (**intag="4042323004"**).

This portion of the **http_TURs.xml** file aggregates RDRs with the RDR tag 71072 (**outtag="71072"**) and persists them into the database (**sinkid="dbsink1"**).

The buckets aggregate the data using three HTTP_TUR fields: 7, 18, and 19. These fields correspond to ACCESS_STRING, SERVICE_COUNTER_ID, and PACKAGE_COUNTER_ID. The bucket identifiers are similar to the fields appearing in the SQL "GROUP BY" clause. The database definition is located in the **<sinks>** section under the **<dbsink id="dbsink1">** tag. The outtag table definition is located in the **dbtables.xml** tables configuration file.

```
<aggregation id="HTTP TURs by domain, per service, per package" intag="4042323004"
outtag="71072" sinkid="dbsink1" period="60" top="500" topid="1" topby="4,5,6,8"> <!--
topby - out index -->
  <bucketident>
    <field inindex="7" type="string" index="1"
pretransform="com.cisco.scmscm.adapters.rag.transforms.URLToDomain"/> <!-- ACCESS_string
to domain-->
    <field inindex="18" type="int" index="2"/> <!-- Service counter id -->
    <field inindex="19" type="int" index="3"/> <!-- Package counter id -->
    <totals>
      <total set="1"/>
      <total set="2"/>
```

```

        <total set="3"/>
        <total set="1,2"/>
        <total set="1,3"/>
        <total set="2,3"/>
        <total set="1,2,3"/>
    </totals>
</bucketident>
<closures/>
<accumulators>
    <field inindex="0" type="int" kind="agg_period" index="0"/>
    <field inindex="0" type="long" kind="count" index="4"/>
    <field inindex="15" type="long" index="5"/>
    <field inindex="16" type="long" index="6"/>
    <field inindex="13" type="long" index="7" unitsFactor="1000"/>
    <field inindex="0" type="long" kind="uniq_count" index="8"/>
    <field inindex="6" type="long" kind="rank" index="9"/>
    <field inindex="4" type="long" kind="rank" index="10"/>
    <field inindex="8" type="long" kind="rank" index="11"/>
</accumulators>
<monitors/>
</aggregation>

```

The video_TURs.xml File

The following sample represents a section of the **video_TURs.xml** file, which defines aggregations for the incoming VIDEO Transaction Usage RDRs (**intag="4042323072"**):

```

<aggregation id="Video TURs by domain, per service, per package" intag="4042323072"
outtag="71074" sinkid="dbsink1" period="60" top="500" topid="1" topby="4,5,6,8"> <!--
topby - out index -->
    <bucketident>
        <field inindex="7" type="string" index="1"
pretransform="com.cisco.scmscm.adapters.rag.transforms.URLToDomain"/> <!-- ACCESS_string
to domain-->
        <field inindex="18" type="int" index="2"/> <!-- Service counter id -->
        <field inindex="19" type="int" index="3"/> <!-- Package counter id -->
            <totals>
                <total set="1"/>
                <total set="2"/>
                <total set="3"/>
                <total set="1,2"/>
                <total set="1,3"/>
                <total set="2,3"/>
                <total set="1,2,3"/>
            </totals>
        </bucketident>
    <closures/>
    <accumulators>
        <field inindex="0" type="int" kind="agg_period" index="0"/>
        <field inindex="0" type="long" kind="count" index="4"/>
        <field inindex="15" type="long" index="5"/>
        <field inindex="16" type="long" index="6"/>
        <field inindex="13" type="long" index="7" unitsFactor="1000"/>
        <field inindex="0" type="long" kind="uniq_count" index="8"/>
        <field inindex="6" type="long" kind="rank" index="9"/>
        <field inindex="4" type="long" kind="rank" index="10"/>
        <field inindex="8" type="long" kind="rank" index="11"/>
    </accumulators>
    <monitors/>
</aggregation>

```

The vlink_BW_per_pkg.xml File

The following sample represents a section of the **vlink_BW_per_pkg.xml** file, which defines aggregations for the uplink and downlink fields in the Subscriber Usage RDRs (**intag="4042321920"**):

```
<aggregation id="NUR's by VLINK UPSTREAM and subs usage counter" intag="4042321920"
outtag="71080" sinkid="dbsink1">
  <bucketident>
    <field index="1" type="string"/>
    <field index="12" type="int"/> <!-- Check the type -->
  </bucketident>
  <closures/>
  <accumulators>
    <!-- duration=6, up=8, down=9, sessions=10, seconds=11 (not to use) -->
    <field index="6" type="long"/>
    <field index="8" type="long"/>
    <field index="9" type="long"/>
    <field index="10" type="long"/>
    <field index="11" type="long"/>
  </accumulators>
  <monitors>
    <timeoutmonitor action="checkpoint" maxsec="900" active="true"/>
  </monitors>
</aggregation>
```

The vsa_SURs.xml File

The following sample represents a section of the **vsa_SURs.xml** file, which defines aggregations for the VSA fields present in the Subscriber Usage RDRs (**intag="4042321920"**):

```
<aggregation id="VSA SURs by device type, per service"
  intag="4042321920" outtag="71076" sinkid="dbsink1" period="60" top="500"
  topid="1" topby="3,4,5"> <!-- topby - out index -->
  <bucketident>
    <field inindex="19" type="string" index="1"
pretransform="com.cisco.scmscm.adapters.rag.transforms.IMEIToDeviceType" />
    <field inindex="2" type="int" index="2" /> <!-- Service usage counter id -->
  <totals>
    <total set="1" />
    <total set="2" />
    <total set="1,2" />
  </totals>
</bucketident>
<closures />
<accumulators>
  <field inindex="0" type="int" kind="agg_period" index="0" />
  <field inindex="8" type="long" index="3" />
  <field inindex="9" type="long" index="4" />
  <field inindex="0" type="long" kind="uniq_count" index="5" />
  <field inindex="4" type="long" kind="rank" index="6" />
  <field inindex="5" type="long" kind="rank" index="7" />
</accumulators>
<monitors />
</aggregation>
```


The cdma_SURs.xml file

The following sample represents a section of the **Cdma_SURs.xml** file, which defines aggregations for the VSA fields present in the Subscriber Usage RDRs (**intag="4042321920"**):

```
<aggregations>
  <aggregation id="CDMA SURs by device type, per service"
    intag="4042321920" outtag="71082" sinkid="dbsink1" period="60" top="-1"
    topid="1" topby="3,4,5"> <!-- topby - out index -->
    <bucketident>
      <field inindex="26" type="string" index="1"

pretransform="com.cisco.scmscm.adapters.rag.transforms.MEIDToDeviceType" /> <!-- Need to
identify device type-->
      <field inindex="2" type="int" index="2" /> <!-- Service usage counter
id -->

      <totals>
        <total set="1" />
        <total set="2" />
        <total set="1,2" />
      </totals>
    </bucketident>
    <closures />
    <accumulators>
      <field inindex="0" type="int" kind="agg_period" index="0" /> <!-- agg
period -->
      <field inindex="8" type="long" index="3" /> <!--
SESSION_UPSTREAM_VOLUME -->
      <field inindex="9" type="long" index="4" /> <!--
SESSION_DOWNSTREAM_VOLUME -->
      <field inindex="0" type="long" kind="uniq_count" index="5" /> <!-- UNIQ
SUBSCRIBER -->
      <field inindex="4" type="long" kind="rank" index="6" /> <!-- RANK
VOLUME-->
      <field inindex="5" type="long" kind="rank" index="7" /> <!-- UNIQ_SUBS
RANK-->

    </accumulators>
    <monitors />
  </aggregation>
```

Custom Adapter Configuration

The Custom Adapter allows users to configure specific fields in a CSV file for a particular RDR. The `~scmscm/cm/config/customadapter/custom.xml` file contains this configuration:

```
<customadapter>
<description>Customized CSV Adapter</description>
<config>
<rdrs>
  <rdr tag="4042321925" sinkId="csv1">
    <fields>
      <field outindex="0" name="RDR_TAG" type="STRING" constant="4042321925" />
      <field outindex="1" name="LINK_ID" type="STRING" rdrindex="0" />
      <field outindex="2" name="GEN_ID" type="STRING" rdrindex="1" />
      <field outindex="3" name="SVC_ID" type="STRING" rdrindex="2" />
      <field outindex="4" name="UPSTREAM_VOL" type="LONG" rdrindex="6" />
      <field outindex="5" name="DOWNSTREAM_VOL" type="LONG" rdrindex="7" />
      <field outindex="6" name="TOTAL_VOL" type="LONG" expr="(F6+F7)" />
      <!--<field outindex="7" name="SUB_CONST" type="STRING" expr="F0+FC"
constant="HELLO"/>-->
    </fields>
  </rdr>
</rdrs>
<sinks>
  <csvsink id="csv1" classname="com.cisco.scmscm.adapters.custom.sinks.CSVSink"
filenameformat="yyyy-MM-dd_HH-mm-ss-SSS'.csv' "
dirname="~/cm/adapters/CustomAdapter/csvfiles/4042321925" maxlines="1000" active="true" />
</sinks>
</config>
</customadapter>
```



Note

These configured RDR TAG IDs should be added in the `~scmscm/cm/config/queue.conf` file under the `[bill-custom]` section.

The sink information should also be configured in the `~scmscm/cm/config/customadapter/custom.xml` file for the Custom Adapter to store the customized RDR records. The sink IDs should be unique for each RDR.

Table A-1 defines the fields in the `custom.xml` file.

Table A-1 *custom.xml File Fields*

Fields	Definition
outindex	Refers to the column index of the csv file.
name	Column name of the csv file.
type	Refers to the Data Type for the corresponding column
rdrindex	Refers to the rdr fields that need to be processed.
expr	Performs Arithmetic Expressions between RDR Fields and with constant values.
(ex:- expr	"(F6+F7)"à Perform Addition operation for the rdr field 6 and rdr Field 7 and store the result in the corresponding outindex column

Table A-1 *custom.xml File Fields*

Fields	Definition
expr	"(F0+FC)" à Add rdr Field 0 with a constant value, FC refers to the constant value that needs to be added).
constant	Stores the constant value in the corresponding outindex column.

