

How to use AgenPro generated MIB objects with multiple SNMPv3 contexts?

Reading this article is recommended if you want to use SNMP4J-Agent Managed Objects (MIB) objects like MOScalar and MOTable with multiple SNMPv3 contexts in your agent.

Background

In SNMPv3 the concept of using *contexts* is generally used to separate MIB data into different virtual MIBs named by the context name. As a consequence, a basic requirement for the MIB instrumentation is, that the data content is separated by the contexts. With SNMP4J-Agent you have basically three options to realize this requirement:

1. For each context create a separate ManagedObject instance and register it with the target context using `MOServer.register`.

```
MOScalar myScalarObjAContext1 = new MyScalarObjA(..);
MOScalar myScalarObjAContext2 = new MyScalarObjA(..);

MOServer server = ..;
server.register(myScalarObjAContext1, new OctetString("context1"));
server.register(myScalarObjAContext2, new OctetString("context2"));
```

2. Use the same ManagedObject instance for all target contexts by calling `MOServer.register` repeatedly for each context with the same instance. The single instance is then responsible to deliver and update its content (MIB data) based on the context information given in the `ManagedObject.get`, `.next`, `.prepare`, `.commit`, `.undo`, and `.cleanup` SubRequest parameter in the `MOScope` (in fact it is then a `MOContextScope` member).

```
OctetString context1 = new OctetString("context1");
OctetString context2 = new OctetString("context2");

MOScalar myScalarObjA = new MyScalarObjA(..) {
    public void get(SubRequest request) {
        if (request.getScope() instanceof MOContextScope) {
            MOContextScope scope = (MOContextScope)request.getScope();
            if (context1.equals(scope.getContext())) {
                // return value from context1
                ..
            }
            else if (context2.equals(scope.getContext())) {
                // return value from context2
                ..
            }
            else {
                // cannot be reached
            }
        }
    }
}

MOServer server = ..;
server.register(myScalarObjA, context1);
server.register(myScalarObjA, context2);
```

3. Any combination of the above two approaches will work too.

Step-by-step guide

1. Let AgenPro generate the MIB object stub and agent main code as described in: [Generate code for SNMP4J-Agent with AgenPro](#).
2. Edit the Agent.java file (or modify the AgenPro template) as follows:
 - a. Define the context values you want to support in the agent:

```
//|:AgenPro|=members
OctetString context1 = new OctetString("ctx1");
OctetString context2 = new OctetString("ctx2");
//|:AgenPro:|
```

- b. Add the contexts to the MOServer instance(s) you use in the agent:

```
public static void main(String[] args) {
    //|:AgenPro|=main
    server.addContext(context1);
    server.addContext(context2);
    defaultMain(args);
    //|:AgenPro:|
}
```

- c. Register your MIB object instances for each context separately (as explained above in the *Background* section):

```
protected void registerMIBs()
{
    //|:AgenPro|=registerBefore
    try {
        // Create a new instance per generated MIB module (you can use different MOFactory
        instances per context if needed):
        Snmp4jAgentTutorialMib tutorialMibCtx1 = new Snmp4jAgentTutorialMib(getFactory());
        tutorialMibCtx1.registerMOs(server, context1);
        Snmp4jAgentTutorialMib tutorialMibCtx2 = new Snmp4jAgentTutorialMib(getFactory());
        tutorialMibCtx2.registerMOs(server, context2);
    } catch (DuplicateRegistrationException drex) {
        logger.error("Duplicate registration: "+drex.getMessage()+"."+
            " MIB object registration may be incomplete!", drex);
    }
    //|:AgenPro:|
    ..
}
```

3. Configure the SNMPv3 View-based Access Control Model (VACM) MIB to allow SNMPv3 (and/or SNMPv1/2vc) users to access the new non-default contexts:

```

public void run() {
    // initialize agent before registering our own modules
    agent.initialize();
    // this requires sysUpTime to be available.
    registerMIBs();
    // add proxy forwarder
    agent.setupProxyForwarder();
    // now continue agent setup and launch it.
    agent.run();

    //|:AgenPro|=run
    VacmMIB vacm = agent.getVacmMIB();
    vacm.addAccess(new OctetString("v3group"), context1,
        SecurityModel.SECURITY_MODEL_ANY,
        SecurityLevel.AUTH_PRIV,
        MutableVACM.VACM_MATCH_EXACT,
        new OctetString("unrestrictedReadView"),
        new OctetString("unrestrictedWriteView"),
        new OctetString("unrestrictedNotifyView"),
        StorageType.nonVolatile);
    vacm.addAccess(new OctetString("v3group"), context2,
        SecurityModel.SECURITY_MODEL_ANY,
        SecurityLevel.AUTH_PRIV,
        MutableVACM.VACM_MATCH_EXACT,
        new OctetString("unrestrictedReadView"),
        new OctetString("unrestrictedWriteView"),
        new OctetString("unrestrictedNotifyView"),
        StorageType.nonVolatile);
    //|AgenPro:|
}

```

Related articles

- [How to use AgenPro generated MIB objects with multiple SNMPv3 contexts?](#)
- [Simulate MIB modules in AgenPro](#)