METI/MIETI – MÓDULO DE GESTÃO DE REDES

Ano Letivo 2024/2025 • Teste escrito • outubro.2024

Duração Total: 100 Minutos

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Questão I: (20%)

Quais as duas características mais relevantes que um programador deve ter em consideração quando ponderar utilizar a arquitetura SNMP no desenvolvimento de software de gestão de aplicações de controlo em ambiente de linhas de produção industrial?

Questão II:

Tendo em consideração o enunciado do trabalho prático de GR sobre a utilização do protocolo L-SNMPvS para controlo e monitorização de sistemas domóticos:

(60%) a) Se no trabalho fosse requerido a utilização do protocolo SNMPv2 em vez do L-SNMPvS, então teria de ser utilizada uma MIB funcionalmente equivalente à L-MIBvS apresentada no enunciado do trabalho. Tendo isto em consideração, apresente uma especificação dessa MIB tradicional escrita em SMI e que permitiria uma abstração funcional equivalente à L-MIBvS em anexo. Justifique as suas opções através do campo DESCRIPTION dos objetos presentes na sua MIB ou através dum texto prévio explicativo, ou ambos.

(20%) b) Na sua opinião, quais as principais diferenças da utilização do L-SNMPvS em vez do SNMPv2 (e respetiva L-MIB em vez duma MIB) no desenvolvimento de software de controlo e monitorização domótica (módulo do agente e módulo do gestor)?

```
Domotics L-MIBvS
[…]
-- Structures:
-- (1) device Group
-- (2) sensors Table
-- (3) actuators Table

-- device (1)
-- This group includes objects that represent characteristics of a Domotics device.

device OBJECT {
TYPE Group
INCLUDE id, type, beaconRate, nSensors, nActuators, dateAndTime, upTime, lastTimeUpdated,
operationalStatus, reset
NOTIFICATION id, type, nSensores, nAtuadores, dateAndTime, upTime, lastTimeUpdated,
operationalStatus
NOTIFICATION-RATE beaconRate
DESCRIPTION "Simple list of objects, where each object represents a characteristic
from a domotics device."
IID 1 }

device.id OBJECT {
TYPE String
ACESS read-only
DESCRIPTION "Tag identifying the device (the MacAddress, for example)."
IID 1.1 }

device.type OBJECT {
TYPE String
ACESS read-only
DESCRIPTION "Text description for the type of device (“Lights & A/C Conditioning”, for
example)."
IID 1.2 }
```

```
device.beaconRate OBJECT {
TYPE Integer
ACESS read-write
DESCRIPTION "Frequency rate in seconds for issuing a notification message with information
from this group that acts as a beacon broadcasting message to all the managers in the LAN.
If value is set to zero the notifications for this group are halted."
IID 1.3 }

device.nSensors OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "Number of sensors implemented in the device and present in the sensors Table."
IID 1.4 }

device.nActuators OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION Number of actuators implemented in the device and present in the actuators
Table."
IID 1.5 }

device.dateAndTime OBJECT {
TYPE Timestamp
ACESS read-write
DESCRIPTION "System date and time setup in the device."
IID 1.6 }

device.upTime OBJECT {
TYPE Timestamp
ACESS read-only
DESCRIPTION "For how long the device is working since last boot/reset."
IID 1.7 }

device.lastTimeUpdated OBJECT {
TYPE Timestamp
ACESS read-only
DESCRIPTION "Date and time of the last update of any object in the device L-MIBvS."
IID 1.8 }

device.operationalStatus OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "The operational state of the device, where the value 0
corresponds to a standby operational state, 1 corresponds to a normal operational state
and 2 or greater corresponds to an non-operational error state."
IID 1.9 }

device.reset OBJECT {
TYPE Integer
ACESS read-write
DESCRIPTION "Value 0 means no reset and value 1 means a reset procedure must be done."
IID 1.10 }

-- sensors (2)
-- This Table includes objects that permit access to all sampled values from all the
-- sensors in the device

sensors OBJECT {
TYPE Table
INCLUDE id, type, status, minValue, maxValue, lastSamplingTime
DESCRIPTION "Table with information for all types of sensors connected to the device."
IID 2 }

sensors.id OBJECT {
TYPE String
ACESS read-only
DESCRIPTION "Tag identifying the sensor (the MacAddress, for example)."
IID 2.1 }

sensors.type OBJECT {
TYPE String
ACESS read-only
```

```
DESCRIPTION "Text description for the type of sensor (“Light”, for example)."
IID 2.2 }

sensors.status OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "Last value sampled by the sensor in percentage of the interval between minValue
and maxValue."
IID 2.3 }

sensors.minValue OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "Minimum value possible for the sampling values of the sensor."
IID 2.4 }

sensors.maxValue OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "Maximum value possible for the sampling values of the sensor."
IID 2.5 }

sensors.lastSamplingTime OBJECT {
TYPE Timestamp
ACESS read-only
DESCRIPTION "Time elapsed since the last sample was obtained by the sensor."
IID 2.6 }

-- actuators (3)
-- This Table includes objects that permit control over all the actuators
-- in the device

actuators OBJECT {
TYPE Table
INCLUDE id, type, status, minValue, maxValue, lastControlTime
DESCRIPTION "Table with objects to control all actuators connected to the device."
IID 3 }

actuators.id OBJECT {
TYPE String
ACESS read-only
DESCRIPTION "Tag identifying the actuator (the MacAddress, for example)."
IID 3.1 }

actuators.type OBJECT {
TYPE String
ACESS read-only
DESCRIPTION "Text description for the type of actuator (“Temperature”, for example)."
IID 3.2 }

actuators.status OBJECT {
TYPE Integer
ACESS read-write
DESCRIPTION "Configuration value set for the actuator (value must be between minValue and
maxValue)."
IID 3.3 }

actuators.minValue OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "Minimum value possible for the configuration of the actuator."
IID 3.4 }

actuators.maxValue OBJECT {
TYPE Integer
ACESS read-only
DESCRIPTION "Maximum value possible for the configuration of the actuator."
IID 3.5 }

actuators.lastControlTime OBJECT {
TYPE Timestamp
ACESS read-only
DESCRIPTION "Date and time when the last configuration/control operation was executed."
IID 3.6 }
```