الجامعة السعودية الالكترونية
Saudi Electronic University
2011 1432

College of Computing and Informatics

Network Management

IT340

Assignment 1

Deadline: Day 21/10/2017 @ 23:59

[Total Mark for this Assignment is 4]

Student Details:

Name: **ID:**

CRN: 10127

Instructions:

- This Assignment must be submitted on Blackboard via the allocated folder.
- Email submission will not be accepted.
- You are advised to make your work clear and well-presented, marks may be reduced for poor presentation.
- You MUST show all your work.
- Late submission will result in ZERO marks being awarded.
- Identical copy from students or other resources will result in ZERO marks for all involved students.
- Convert this Assignment to PDF just before submission.

Learning Outcome(s):

Describe the features of SNMP, its architecture and different models like organizational, communicational, functional and information model.

Question One

[1 Mark]

Describe SNMP Architecture and Model.

SNMP Architecture

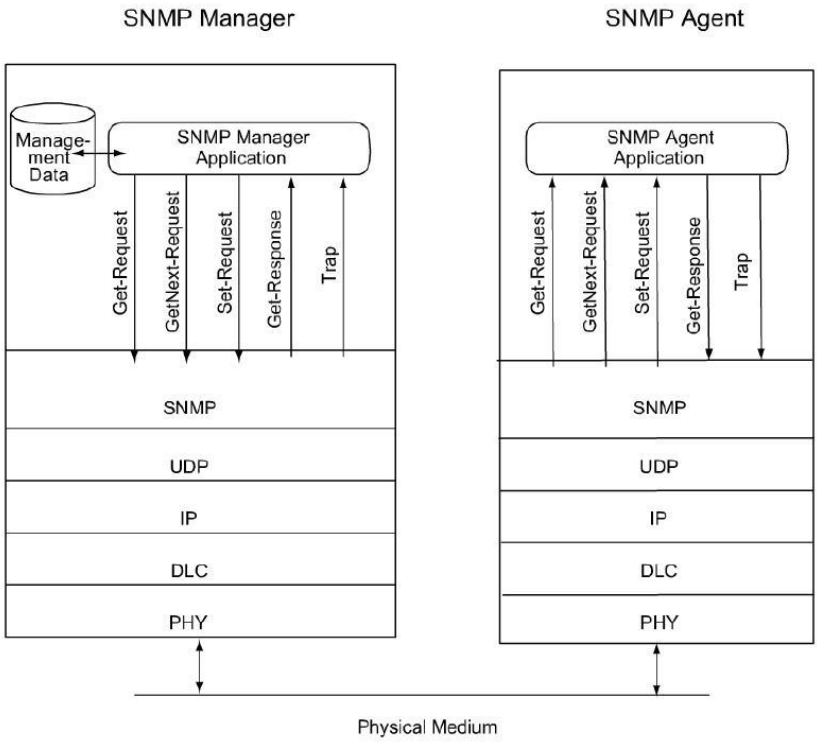


Figure 4.9 SNMP Network Management Architecture

SNMP is based on the manager/agent model, consisting of a manager, an agent, a database of management information, managed objects, and the network protocol.

SNMP allows managers and agents to communicate.

SNMP uses five basic messages, the direction of messages: 3 from manager - 2 from agent

Messaged Sent by Manager:

- Get-Request: requesting data from agent
- Get-Next-Request: This operation is like the Get-Request, but it is requesting data on the next MO to the one specified
- Set-Request: Initializes or changes the value of the managed

device. Messaged Sent by Agent:

- Get-Response: Agent responds with data for get and set requests from the manager
- Trap: Alarm generated by an agent, without request from the manager.

SNMP Models

Organizational:

- Describes the relationship between network element, agent, and manager.
- Define the infrastructure of the SNMP architecture.
- There are three different structures: simple two tier model - three-tier model - proxy model.

Informational:

- Uses ASN.1 syntax
- Deals with SMI (Structure of Management Information) and MIB (Management Information Base).
- Scalar Objects.

Communicational: communication model defines specifications of four aspects of SNMP communication: architecture, administrative model that defines data access policy, SNMP protocol, and SNMP MIB.

- Transfer syntax with unidirectional messages, less complex than OSI
- Transfer structure (PDU)
- SNMP over TCP/IP
- Communication services addressed by messages
- Security framework community-based model

Functional: There are five areas of functions (configuration, fault, performance, security, and accounting) addressed by the OSI mode.

Reference:

Network management: Principles and practice. (2nd ed.): Chapter 4 page: 140 and 185

Chapter 4 slide 11 and 15 - 16

Question Two

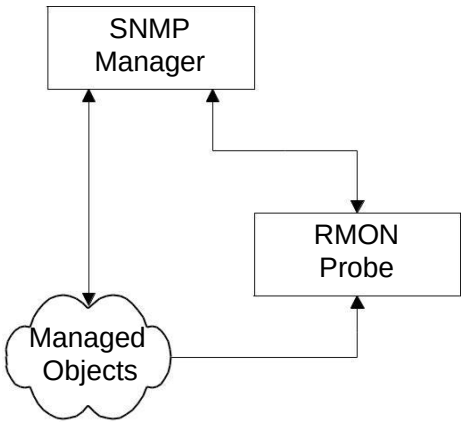
[1 Mark]

Learning Outcome(s):

Compare and contrast different Organization models

Discuss about Three-Tier Organization Model- RMON (Remote Monitoring).

Remote Monitoring (RMON): three-tier architecture.



Three-tier architecture is a type of the organizational modal, it is called three-tier because an intermediate agent is inserted between the managed object and the network manager. A network manager can receive data from managed objects and from the RMON agent.
The RMON function has greatly increased the centralized management of networks.
RMON acts as an agent and a manager.
RMON gathers data from managed object ➔ analyses the data ➔ stores the data ➔ pass it to the manager if required.

Reference:

Network management: Principles and practice. (2nd ed.): page 138 Chapter 4, slide 13

Learning Outcome(s):

Discuss about OSI and internet management models

Question Three

[1 Mark]

Cite two main differences between OSI and Internet management models.

OSI	Internet management TCP/IP
Adopted by the International Standards Organization (ISO)	Adopted by The Internet Engineering Task Force (IETF)
The OSI management protocol standard ➔ is Common Management Information Protocol (CMIP)	The Internet management protocol standard ➔ is Simple Network Management Protocol (SNMP)
Object oriented based on object classes and inheritance rules.	Scalar Objects
More complex and harder to implement.	More easy to implement

Reference:

Network management: Principles and practice. (2nd ed.): Chapter 3, page 96 - 97

Learning Outcome(s):

Administrative structure of SNMP Management including community-based model and access policy

Question Four

[*1 Mark*]

Discuss about the Administrative Model and SNMP Community.

The administrative model defines SNMP Entities, community profile and policy of communication.

IT defines the community within which messages can be exchanged. It also defines the access policy as to who has access privilege to what data.

SNMP Entities:

SNMP application entities: Residing in management stations and network elements

Manager and agent

SNMP protocol entities: Peer processes that implement SNMP and support application entities. Communication processes (PDU handlers)

Community profile and policy:

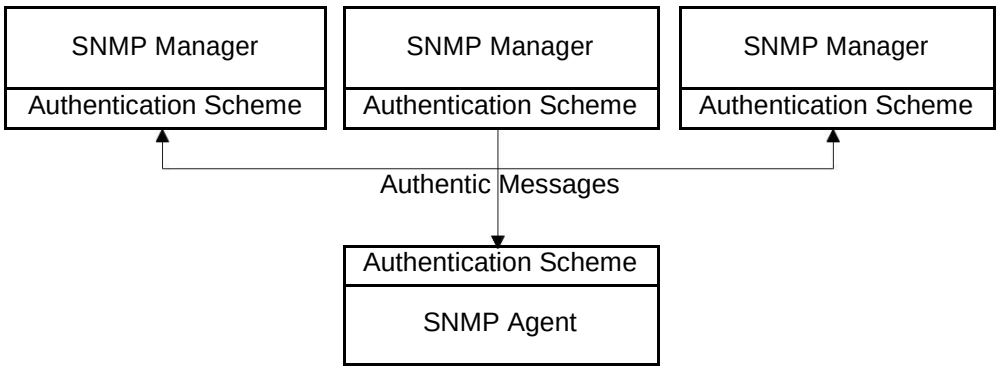
Applications in the same community communicate with each other

Community is Pairing of two application entities: SNMP Manager & SNMP agent.

Community name: is a String of octets

A community name acts as a password that is shared by SNMP agents and one or more SNMP managers.

SNMP community



SNMP community: An SNMP agent only accepts requests from SNMP managers that are on the agent's list of acceptable community names.

- Security in SNMPv1 is community based.
- Authentication scheme in manager and agent.
- Application could have multiple community names.
- Communication is not secured in SNMPv1 - no encryption.
- The manager may be programmed to view only a part of the network element's managed objects which is known as the community MIB view.
- Each community name is assigned an SNMP access mode, either READ-ONLY or READ-WRITE.

Reference:

Network management: Principles and practice. (2nd ed.): Chapter 5, page 185 - 203

Chapter 5, Slide 5 - 6