

SNMP

or

Simple Network Management Protocol

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SNMP Goals

- Management information defined for an object and then exchanged between that object and a network management device
 - Great for managing many different devices
- Separates the functions of defining and communicating management information from the applications that are used for network management
 - The SNMP management model
- The actual SNMP protocol is fairly simple, consisting of only a few easy-to-understand protocol operations
 - The all important operations
- Implementation relatively simple for the designers and manufacturers of products
 - Not always!

A brief history.... not of Time...., but of SNMP

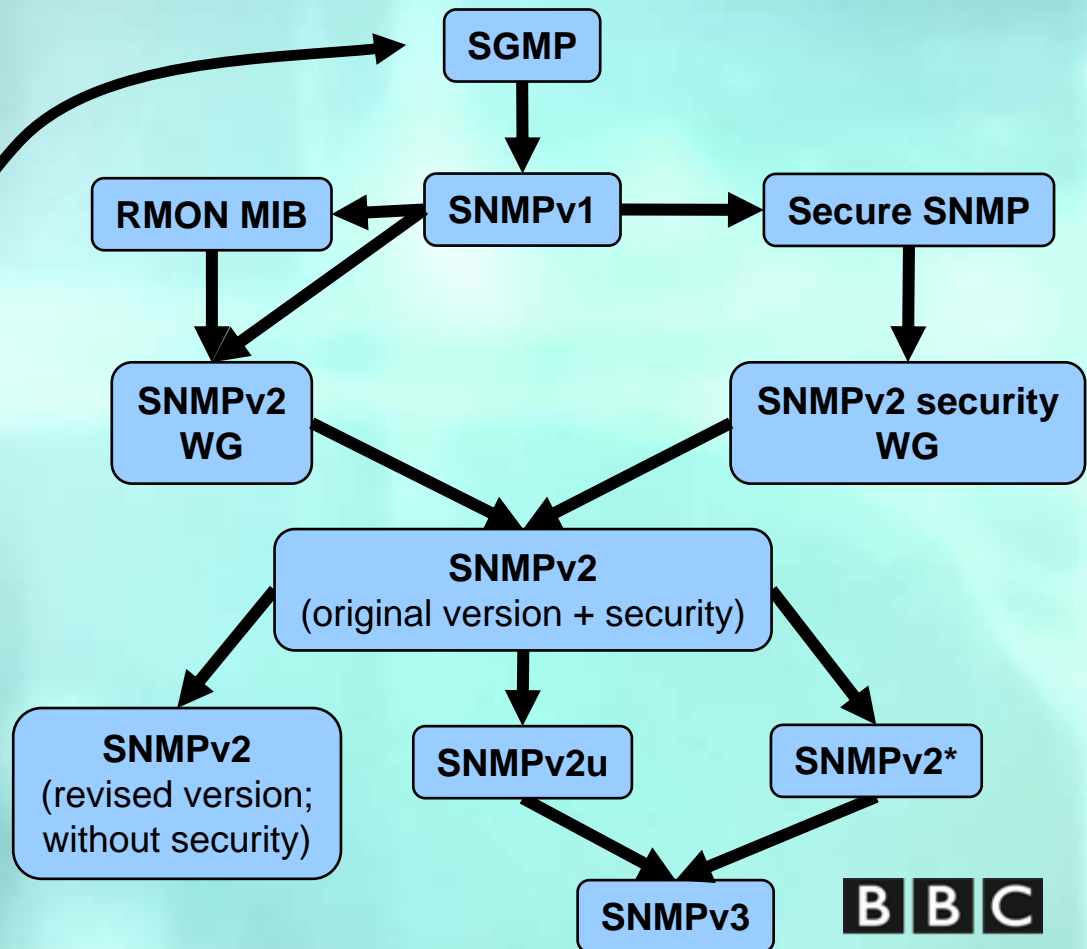
Three main contenders in the
late 1980's

High-Level Entity
Management System
(HEMS) **Withdrawn**

Simple Gateway
Management Protocol
(SGMP) **Became SNMP**

Common Management
Information Protocol
(CMIP) over TCP/IP
(CMOT)

Languishing somewhere!

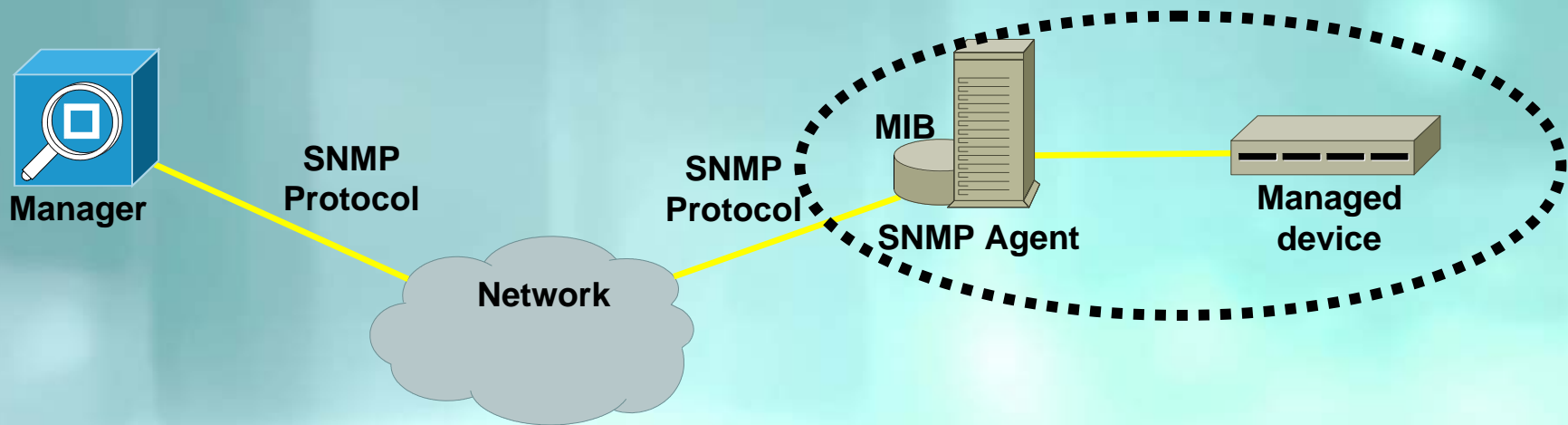


SNMPv1

Provided the three main components of the Internet Standard Management Framework

- Structure of Management Information (SMI)
- Management Information Base (MIB)
- and the SNMP protocol itself

Elements of SNMP Based Model



Manager

Agent

MIB

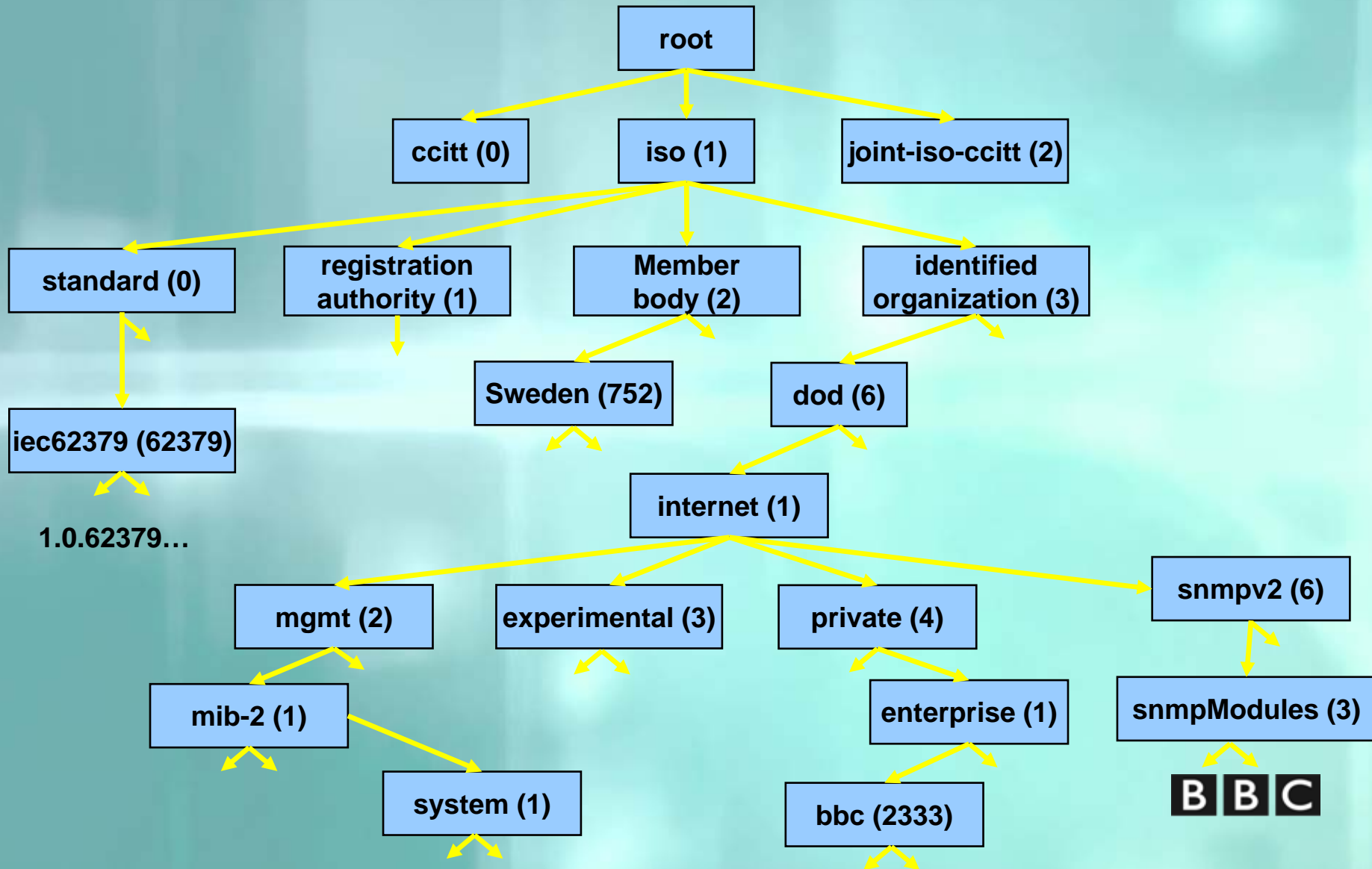
Device

Protocol

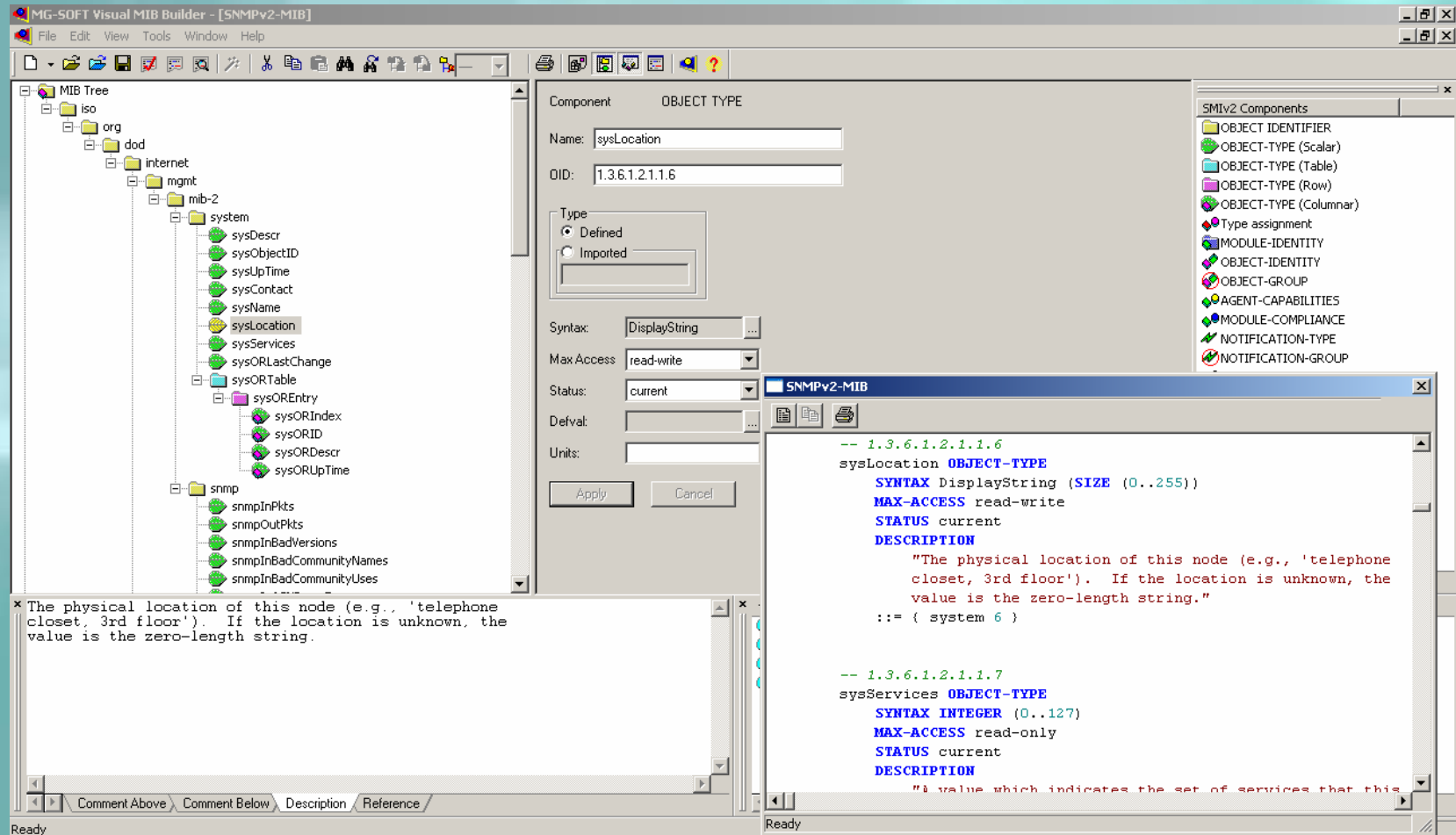
Management Information Base (MIB)

- A virtual database – a description of capability of a device
- Based on subset of ASN.1 (Abstract Syntax Notation)
- ‘Standard’ MIBS
 - RMON v1 & RMONv2
 - MIB I & MIB II

MIB Tree Structure



MIB Design & Build



SNMP Operations

All Available in SNMPv2 and SNMPv3, but not SNMPv1

- GET – retrieve a value
- GETNEXT – retrieve the next closest
- GETBULK – retrieve multiple values
- SET – modify the value of an object
- TRAP – report an event
- INFORM – similar to TRAP

SNMPv2

Deficiencies in SNMPv1 security lead eventually to SNMPv2 and these variants on it:

SNMPsec

SNMPv2p (classic) plus SMIv2

SNMPv1.5!

SNMPv2c

SNMPv2u

SNMPv2*

With all these in the picture – are you confused?

SNMPv3

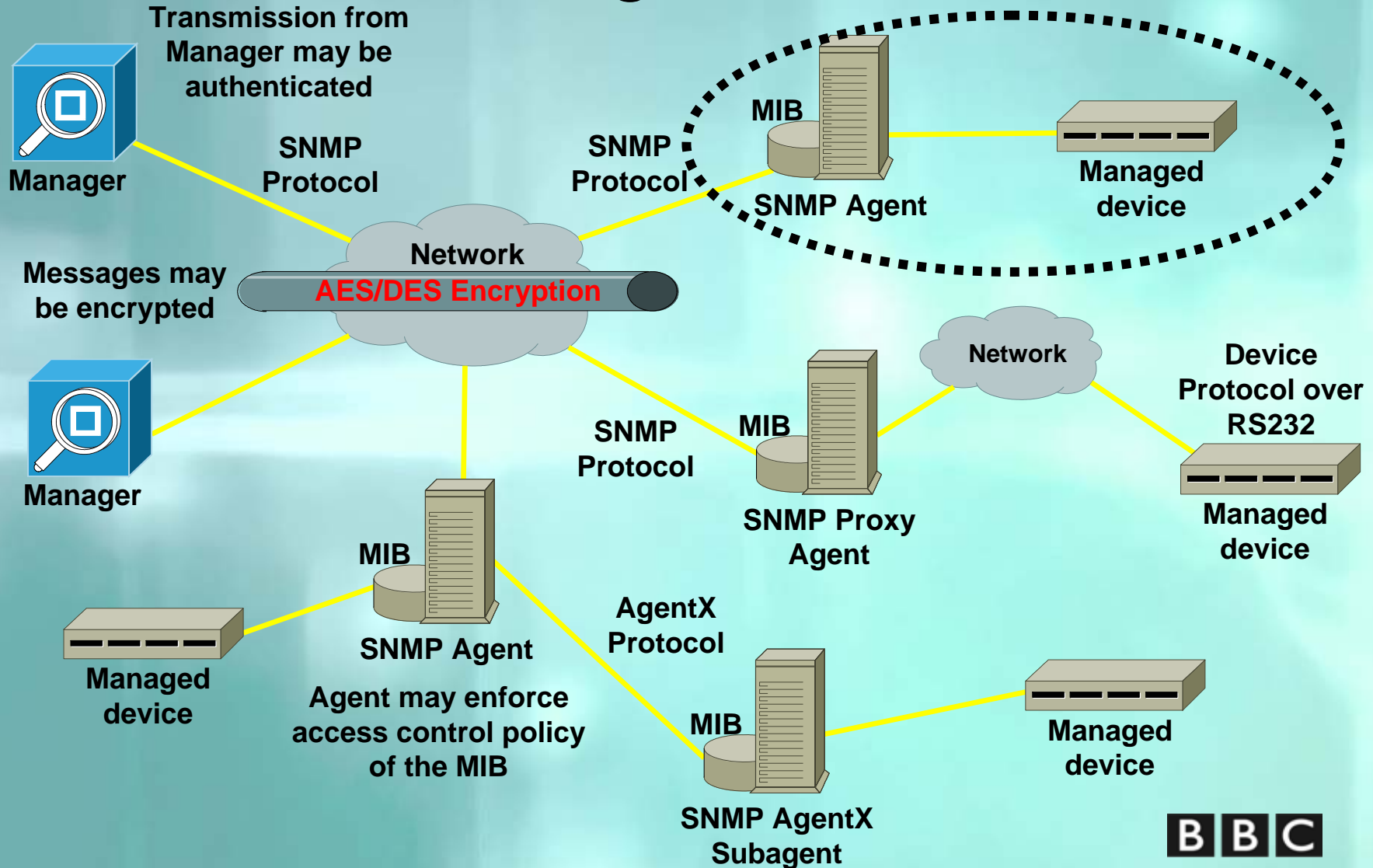
Features....

- Administrative Framework
- User-based Security Model (USM)
- View-based Access Control Model (VACM)
- MIB Improvements
- GetBulk

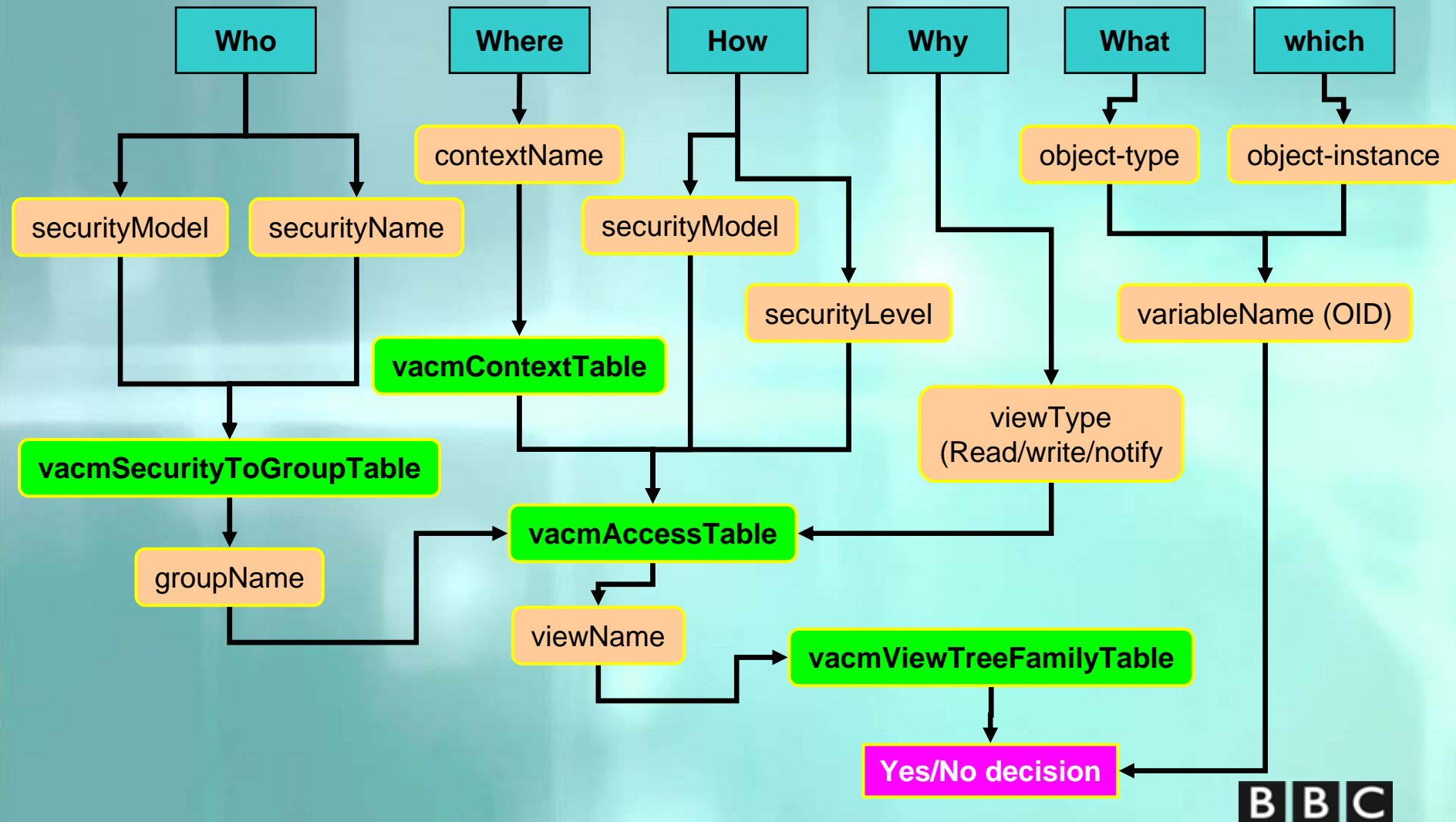
SNMP Extensions

- RMON
 - expansion of SNMP functionality
- AgentX
 - dynamic extension of managed objects – different from proxy agents
- XML to SNMP gateways

Extending the Model

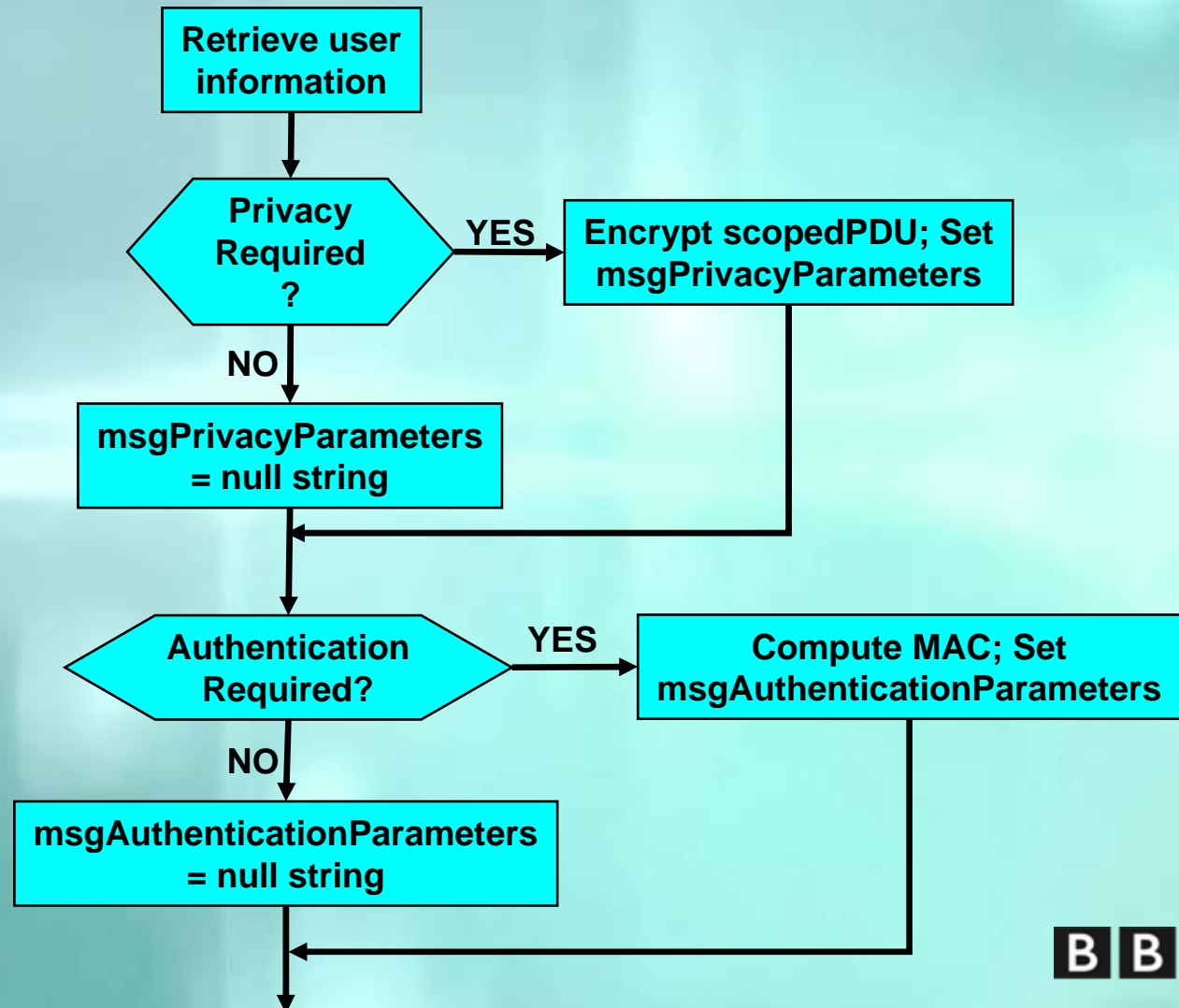


View-based Access Control Model (VACM)



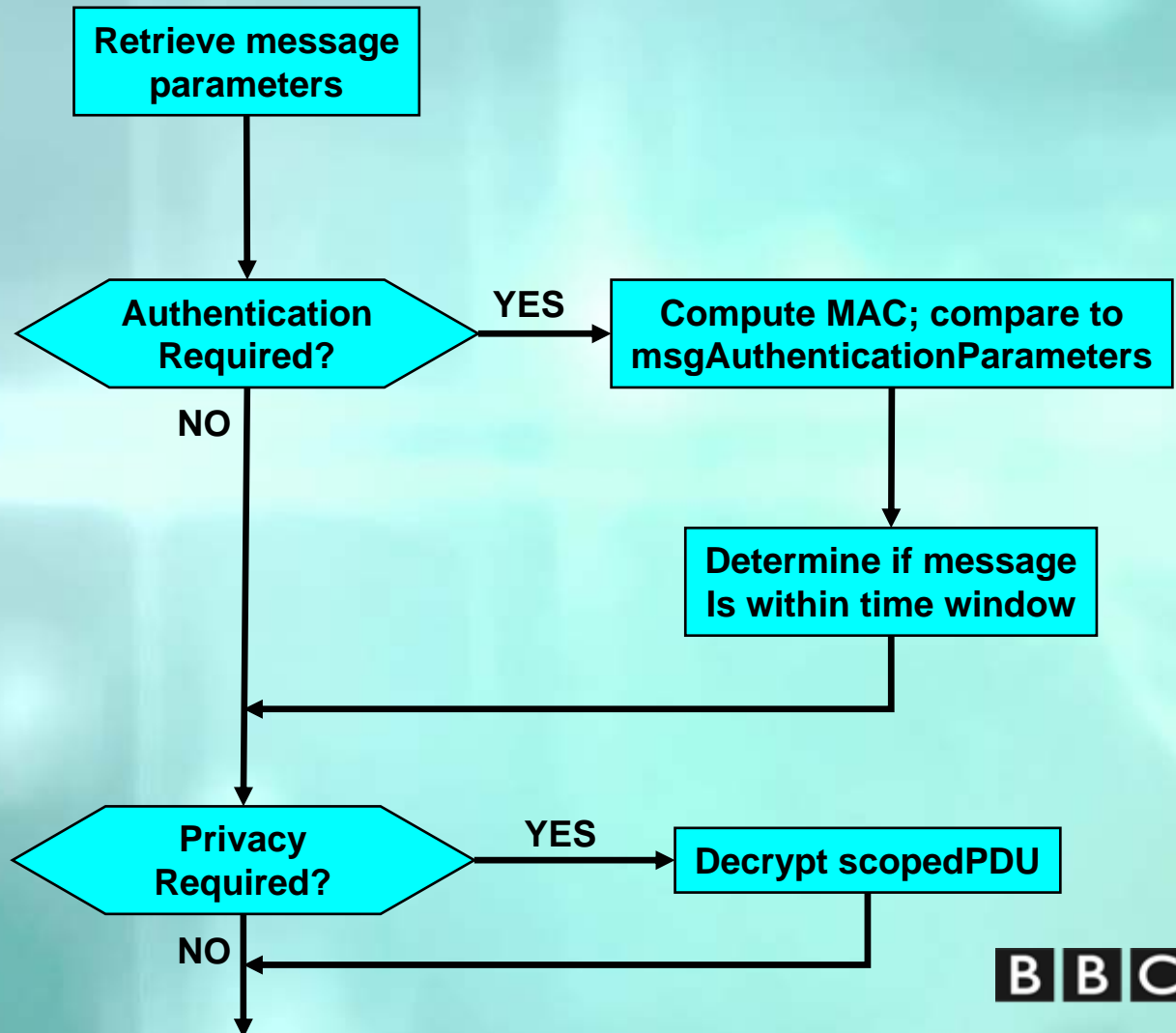
User-based Security Model (USM)

USM Message Transmission Processing



User-based Security Model (USM)

USM Message Reception Processing





SNMP Tools

Tools available to:

- Design, build and check MIBS
- Monitor and control agents through general purpose graphical or command line managers
- Help embed agents into controlled devices



Summary

- SNMP provides a standardised method of network management
- Current versions can include the security necessary if required
- Standardised MIBS for broadcasting use by the IEC with input from EBU N/CNCS WG
- Both free and commercial tools and resources available in SNMP land

Thank you for your time and attention

Any Questions?