Evolution of Network Management

FIGURES

6.2.1 Introduction to network management

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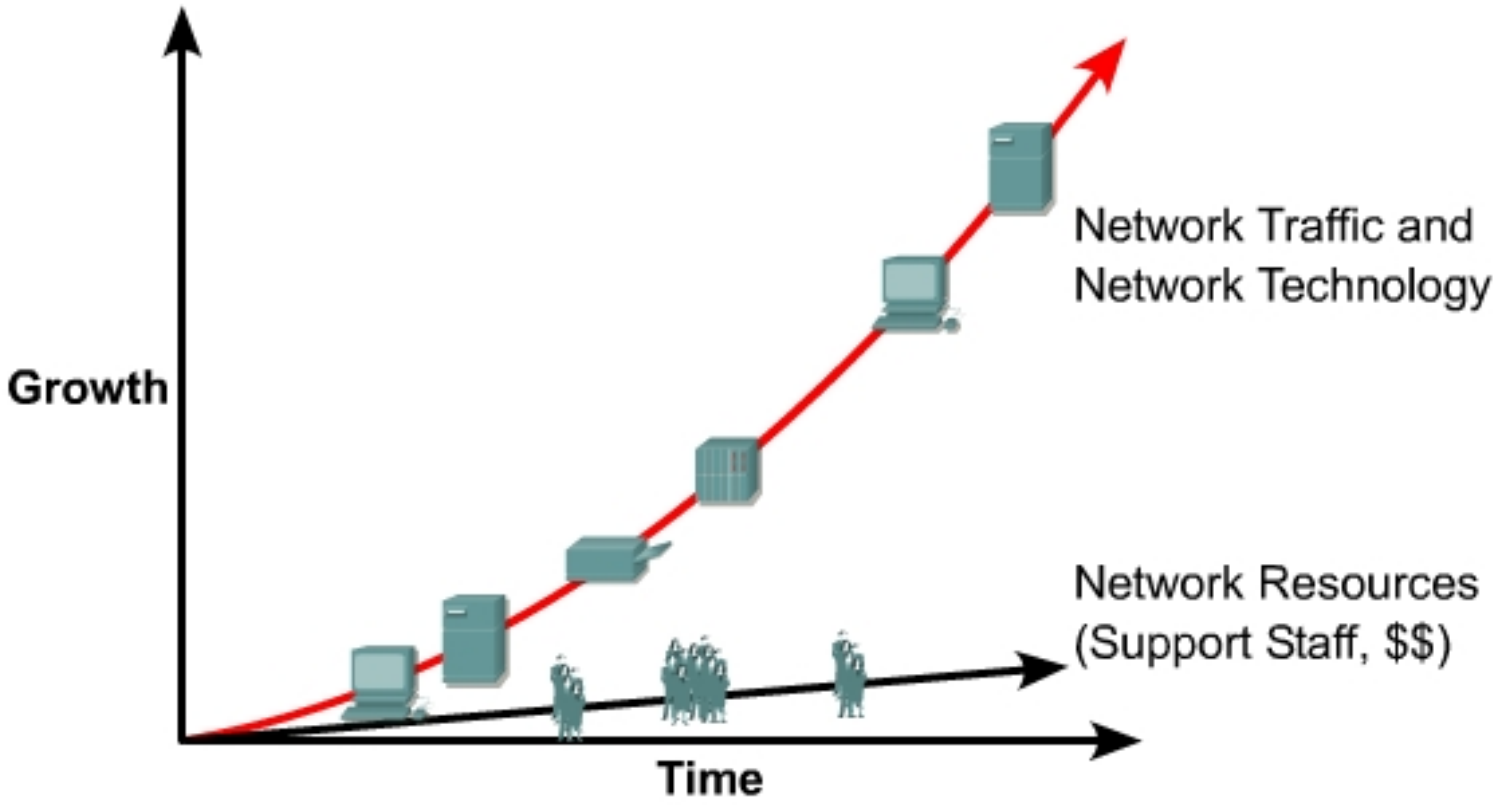

- Networks are increasing in scale and complexity. There is a clear need for management functionality.
- No longer just managing the elements of the network infrastructure, but the services across it as well.

Network Management Requirements

FIGURES

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6.2.1 Introduction to network management

Network Management Tasks

- Ease of use
- Restoral capability
- Monitor network availability
- Improved automation
- Monitor response time
- Security features
- Ability to add and delete users
- Traffic re-routing
- User registration

Network Management Requirements

FIGURES

6.2.1 Introduction to network management

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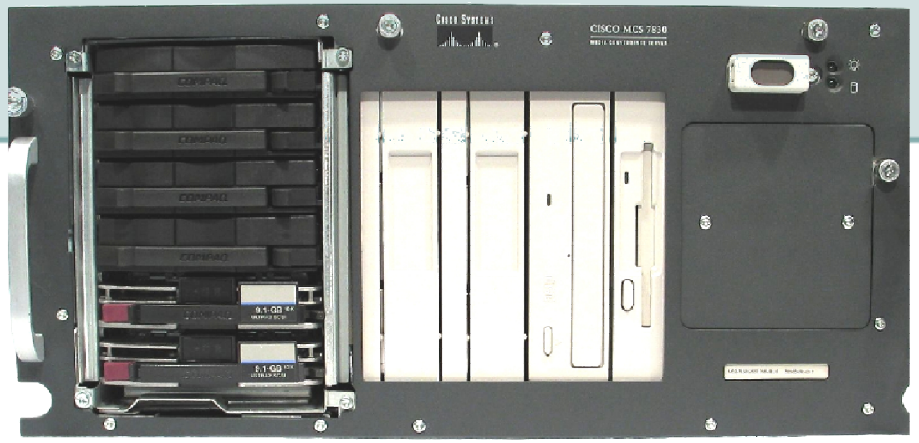
What is driving Network Management?

- Controlling corporate assets
- Controlling complexity
- Improved service
- Improved automation
- Balancing various needs
- Reducing downtime
- Controlling costs



Network Management Requirements Basic Terms

Term	Definition
SNMP	Simple Network Management Protocol is the standard for managing network resources, defined by the IETF.
MIB	Management Information Base is the data definitions/structure of a managed object.
RMON	Remote Monitoring is a MIB/agent specification which defines functions for monitoring remote devices.
RFC	Request for Comment are documents posted by the IETF some are adapted as Internet standards.
NMS	Network Management Station is an SNMP-based management station for managing network devices. Typically this is a UNIX or NT box running, HP Openveiw, SunNET Mgr or NetView for AIX.

Network Management Model

FIGURES

6.2.2 OSI and network management model

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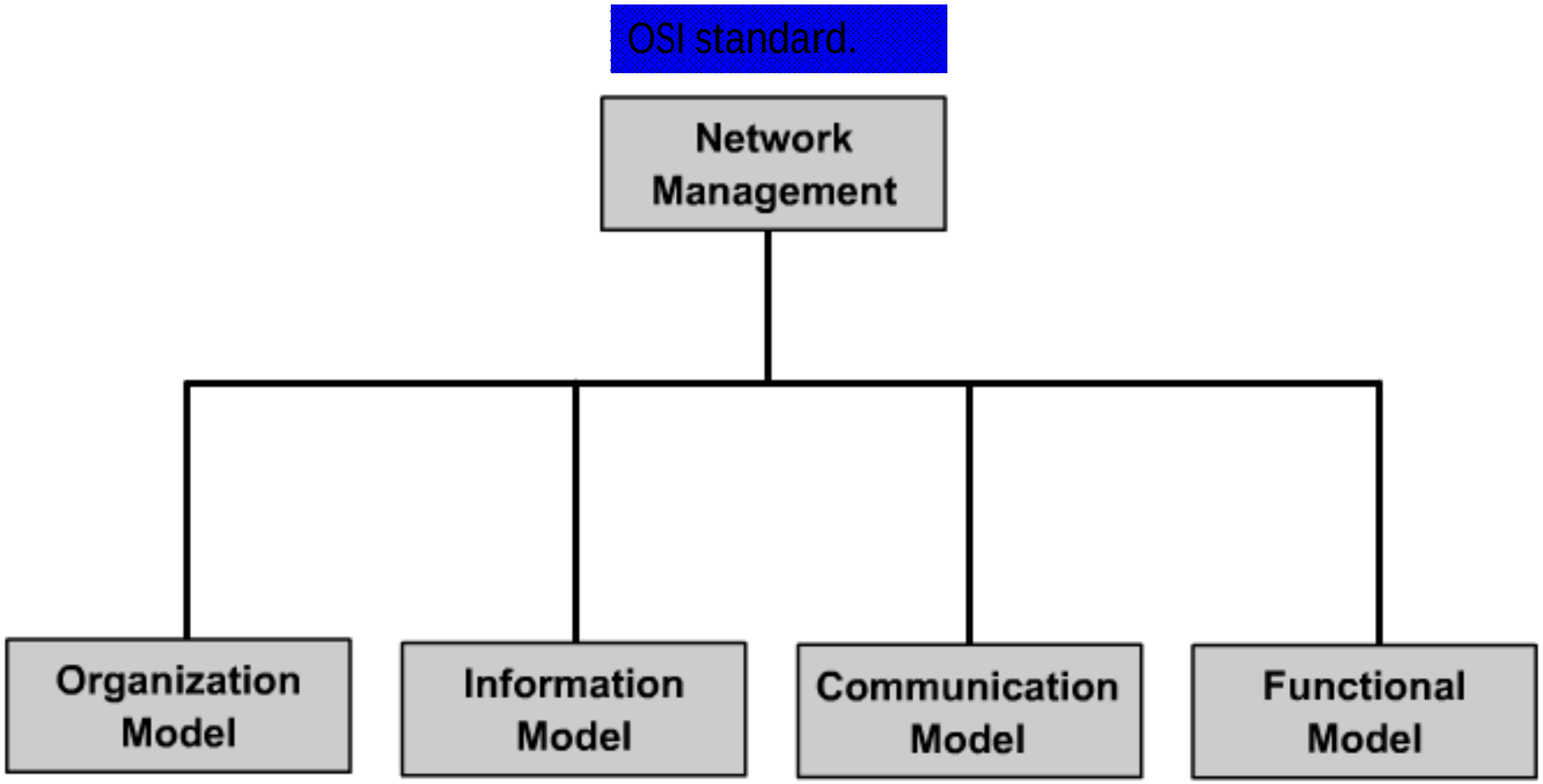

Specifics of each of these models depends upon the network management standard followed

Organization Model

FIGURES

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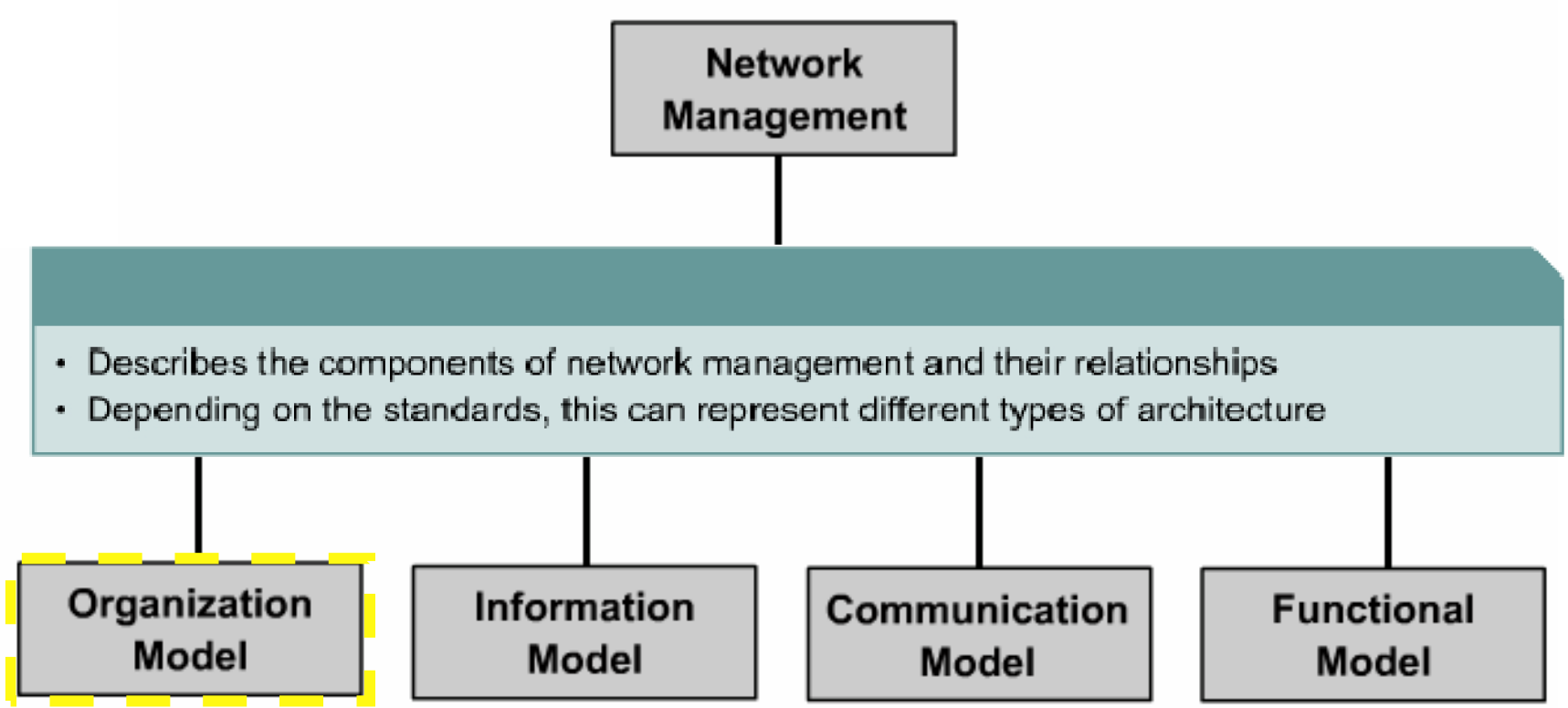

Information Model

FIGURES

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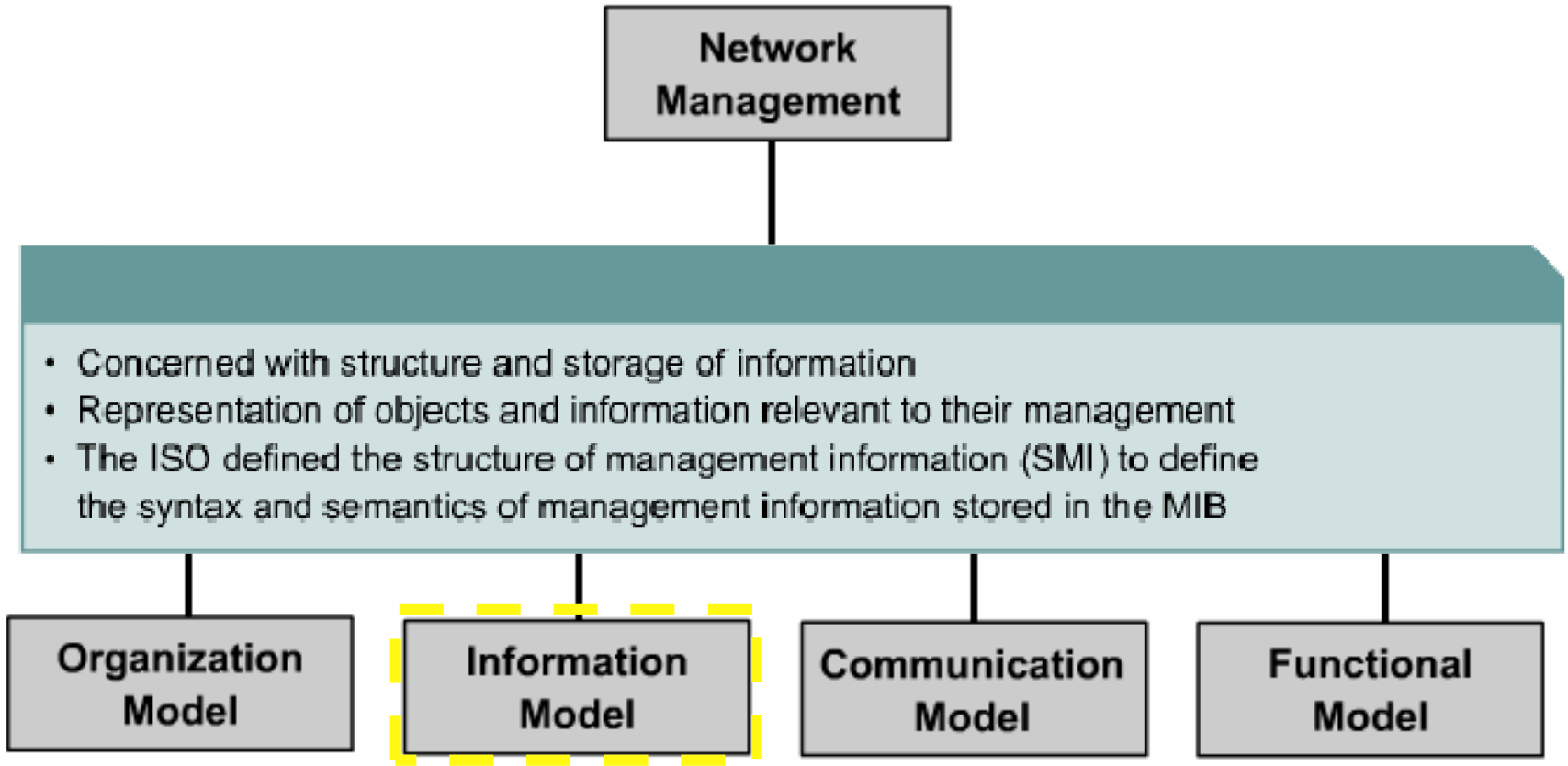

Communication Model

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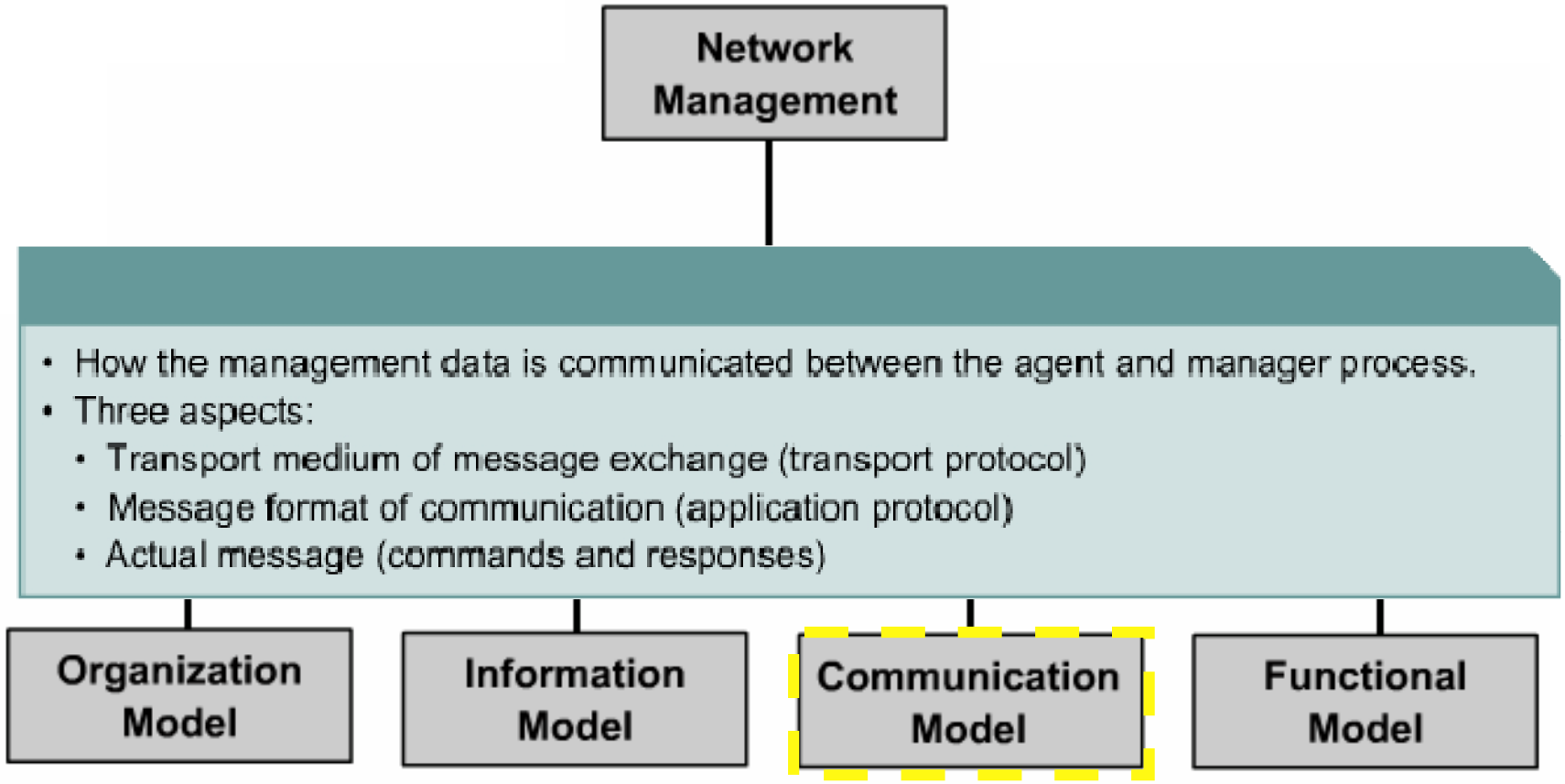

Functional model

FIGURES

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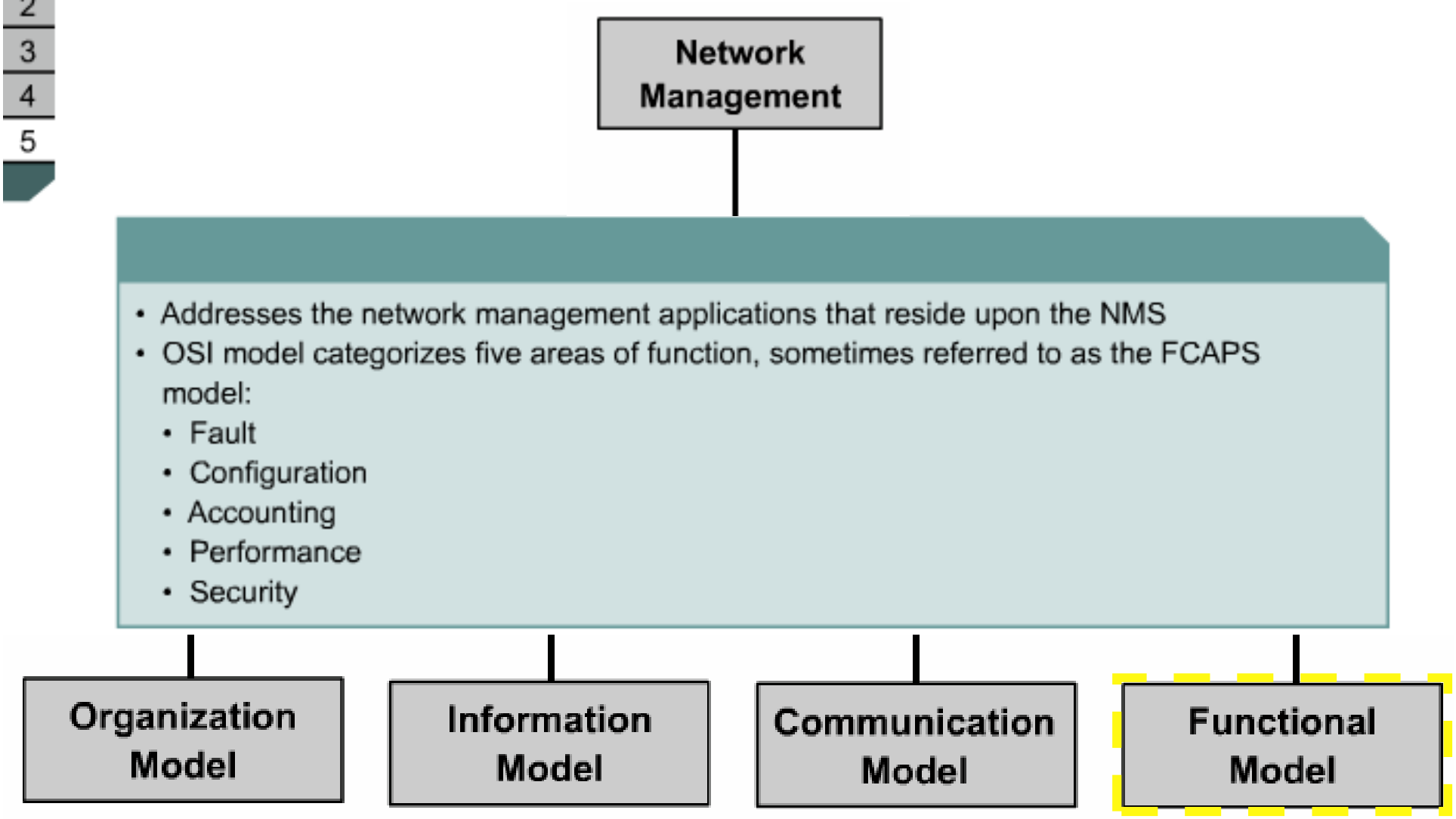
6.2.2 OSI and network management model



Network Management Standards

FIGURE 6.2.3 SNMP and CMIP standards

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1. **Simple Network Management Protocol** – IETF community
2. **Common Management Information Protocol** – Telecommunications community

Internet Community - SNMP

- Simple Network Management Protocol
- A protocol, a database structure specification, and a set of data objects.
- Adopted TCP/IP standard in 1989
- SNMPv2c in 1993, SNMPv3 is the current version

OSI Community - CMIP

- Common Management Information Protocol
- Complex set of standards, defines a management service, a protocol, a database structure specification, and a set of data objects

Components of the Organization Model

FIGURES

6.2.4 SNMP operation

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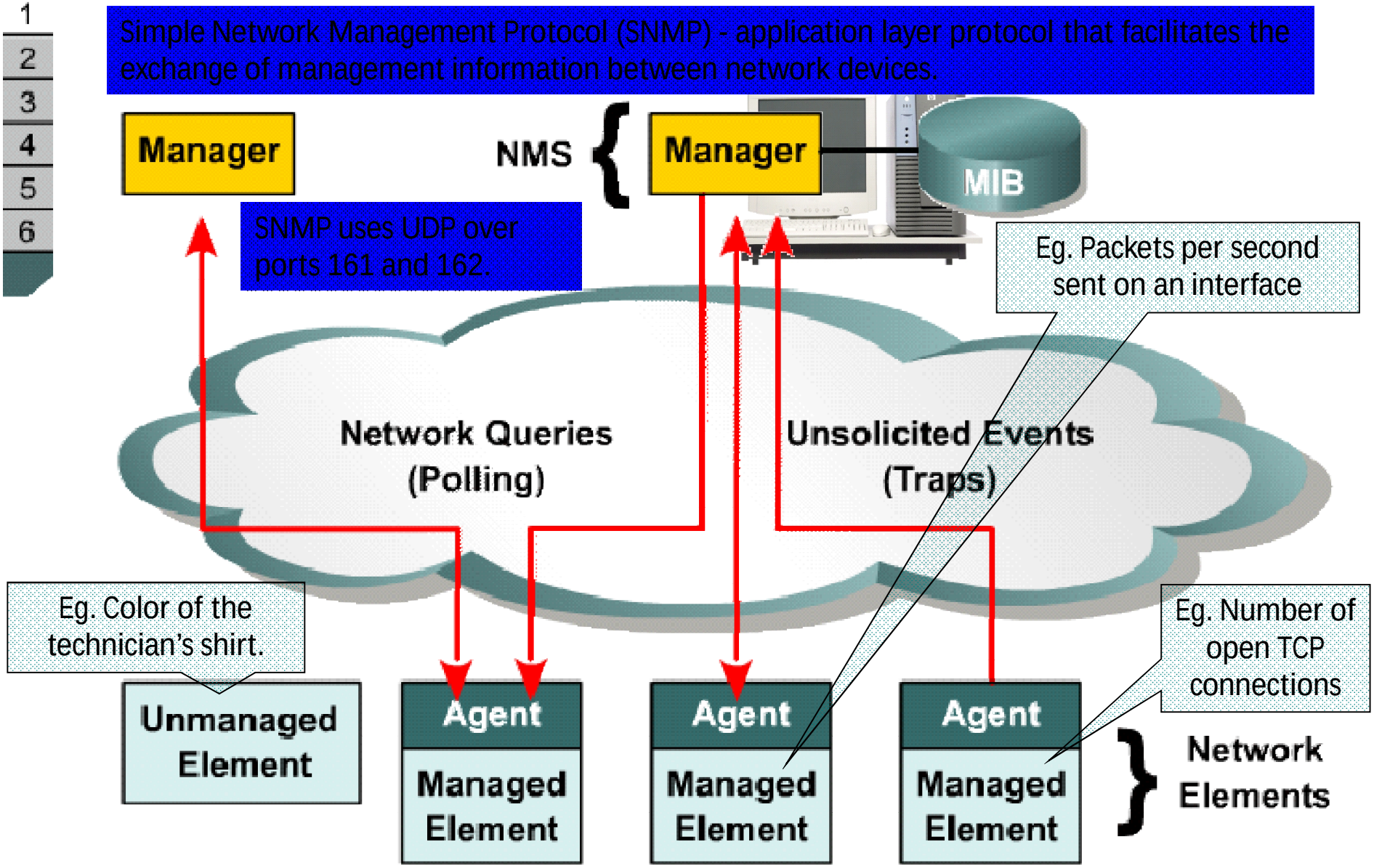
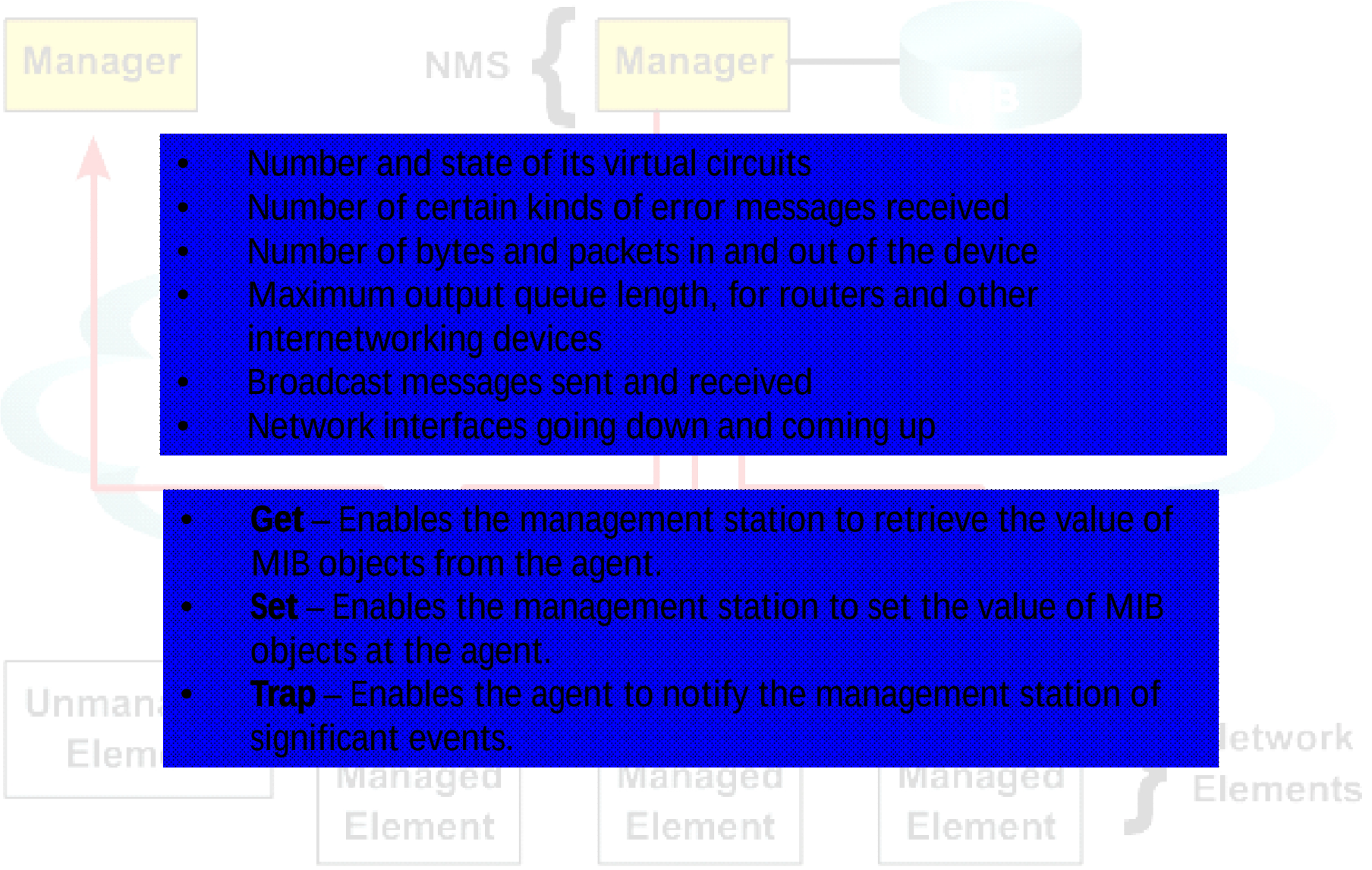


Components of the Organization Model

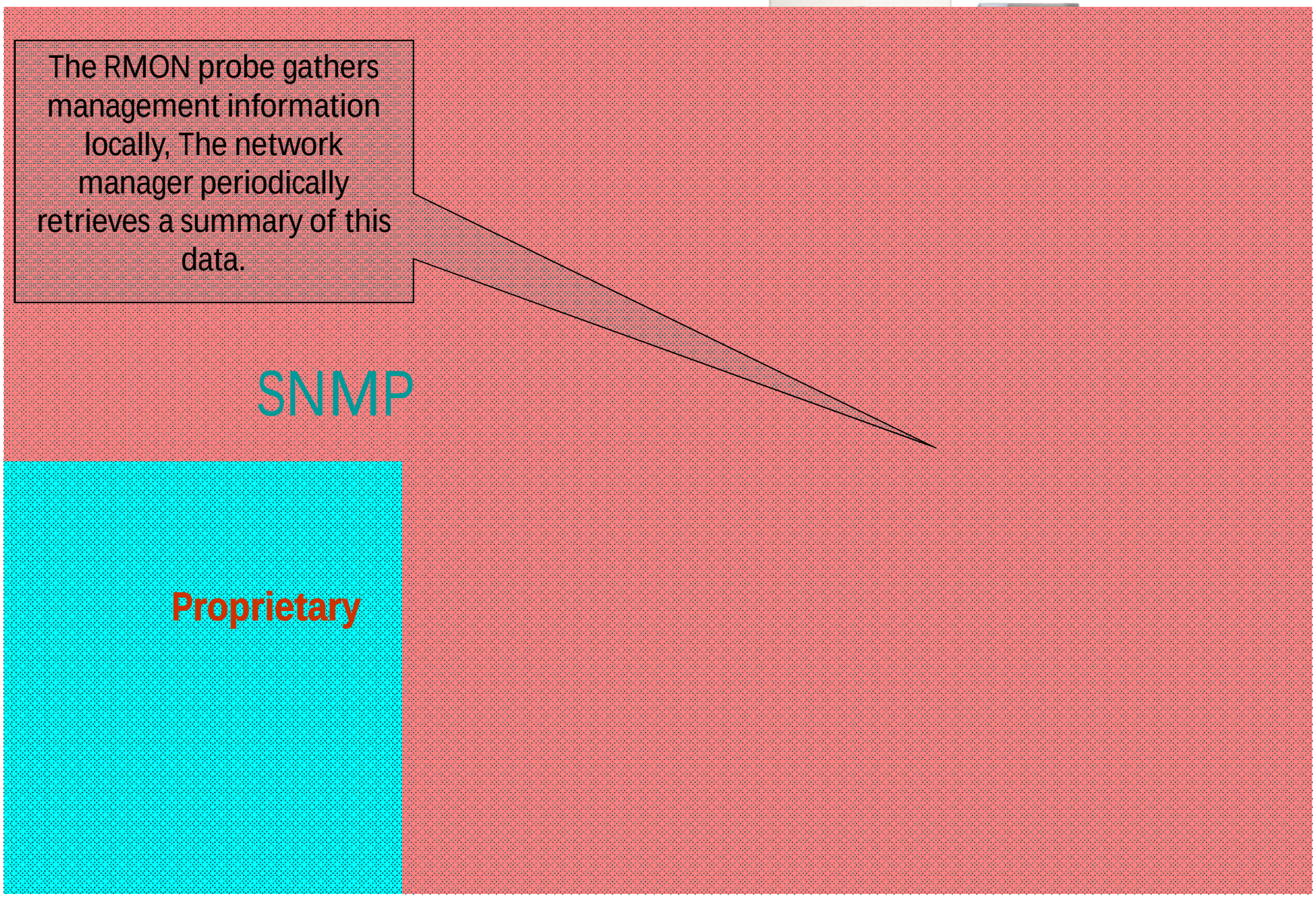
FIGURES



- Number and state of its virtual circuits
- Number of certain kinds of error messages received
- Number of bytes and packets in and out of the device
- Maximum output queue length, for routers and other internetworking devices
- Broadcast messages sent and received
- Network interfaces going down and coming up

- **Get** – Enables the management station to retrieve the value of MIB objects from the agent.
- **Set** – Enables the management station to set the value of MIB objects at the agent.
- **Trap** – Enables the agent to notify the management station of significant events.

6.2.4 SNMP operation



Organization Model

FIGURES

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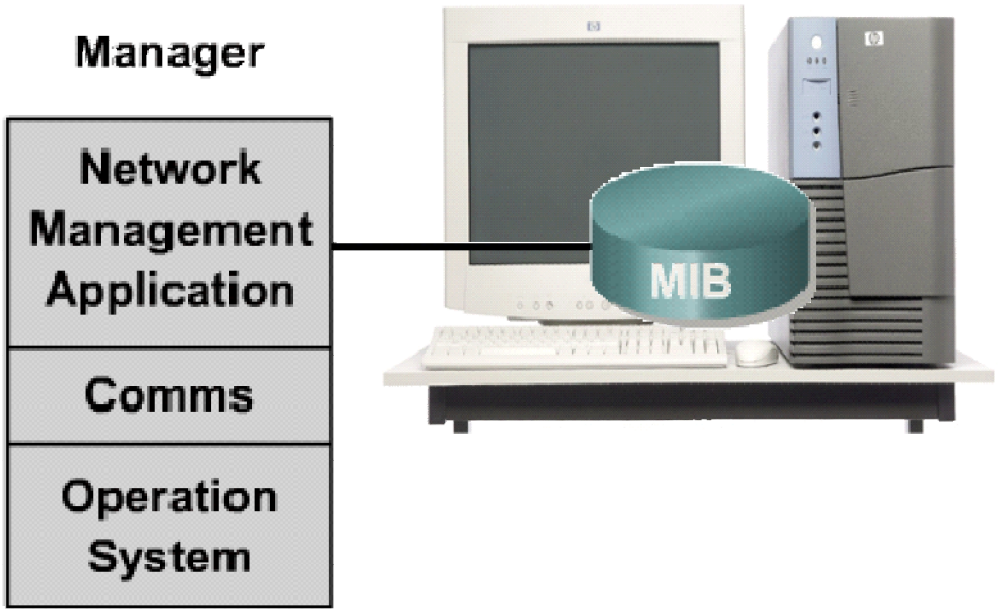
6.2.4 SNMP operation



NMA

- HP Openview, Tivoli, Ciscoworks2000, SNMPv2c

Comms

- UDP, TCP, proprietary

Operating System

- NT, Solaris, HP-UX, W2K

- **The NMS is an ordinary workstation.**
- **Large RAM, to hold all the co-resident management applications.**
- **Typical network protocol stack, such as TCP/IP.**