INTRODUCTION TO TMN

BACKGROUND

STANDARDS

ARCHITECTURES

- FUNCTIONAL ARCHITECTURE
- PHYSICAL ARCHITECTURE
- INFORMATION ARCHITECTURE
- LOGICAL LAYERED ARCHITECTURE

RELATION TO OTHER APPROACHES

- ISO-OSI
- SNMP

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BACKGROUND

TELECOMMUNICATIONS MANAGEMENT NETWORK

ITU-T

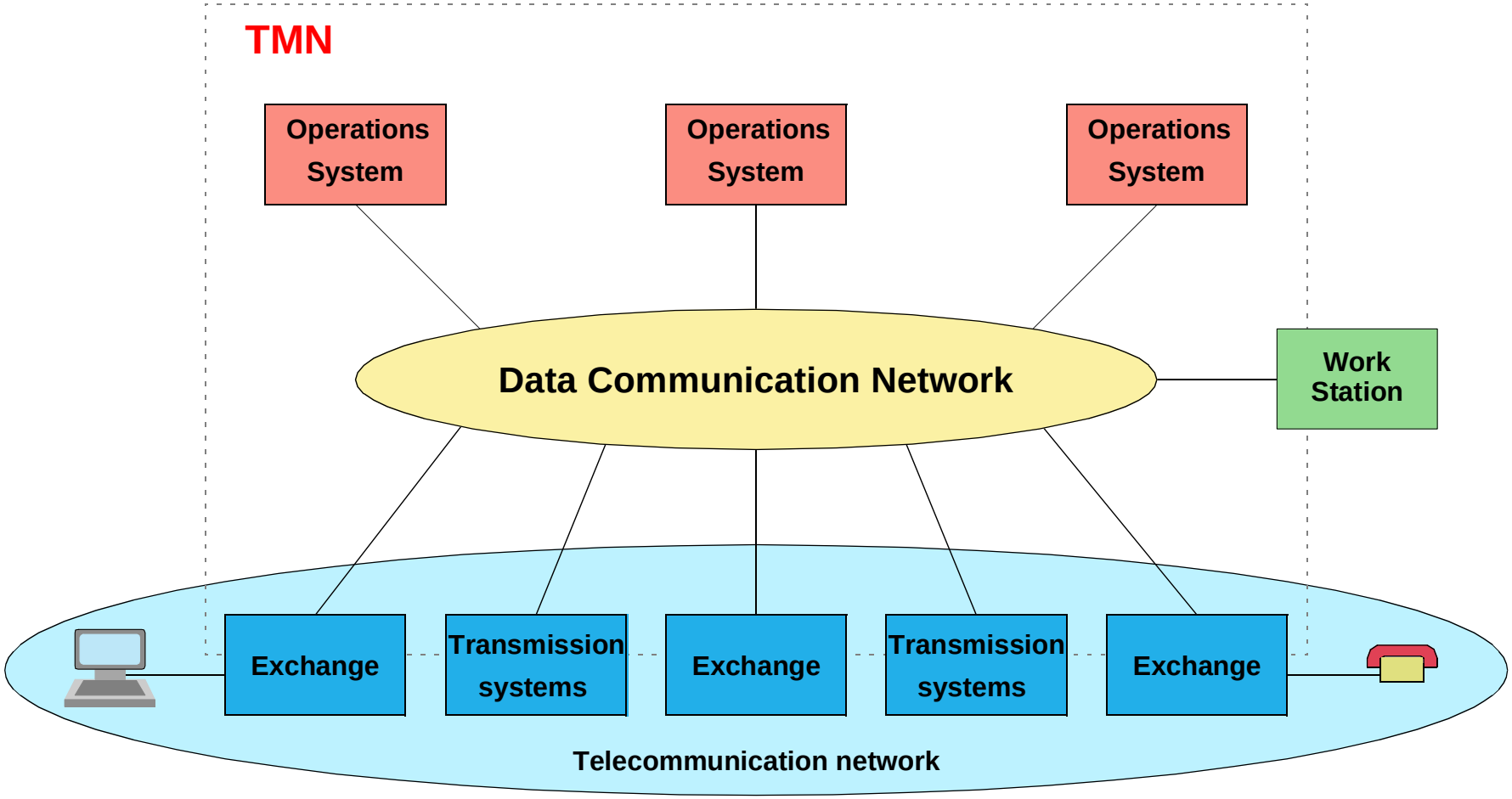
DEFINITION STARTED 1985

DEFINED IN M-SERIES
- M.3010

USES OSI SYSTEMS MANAGEMENT

FAMOUS FOR ITS MANAGEMENT HIERARCHY CONCEPT

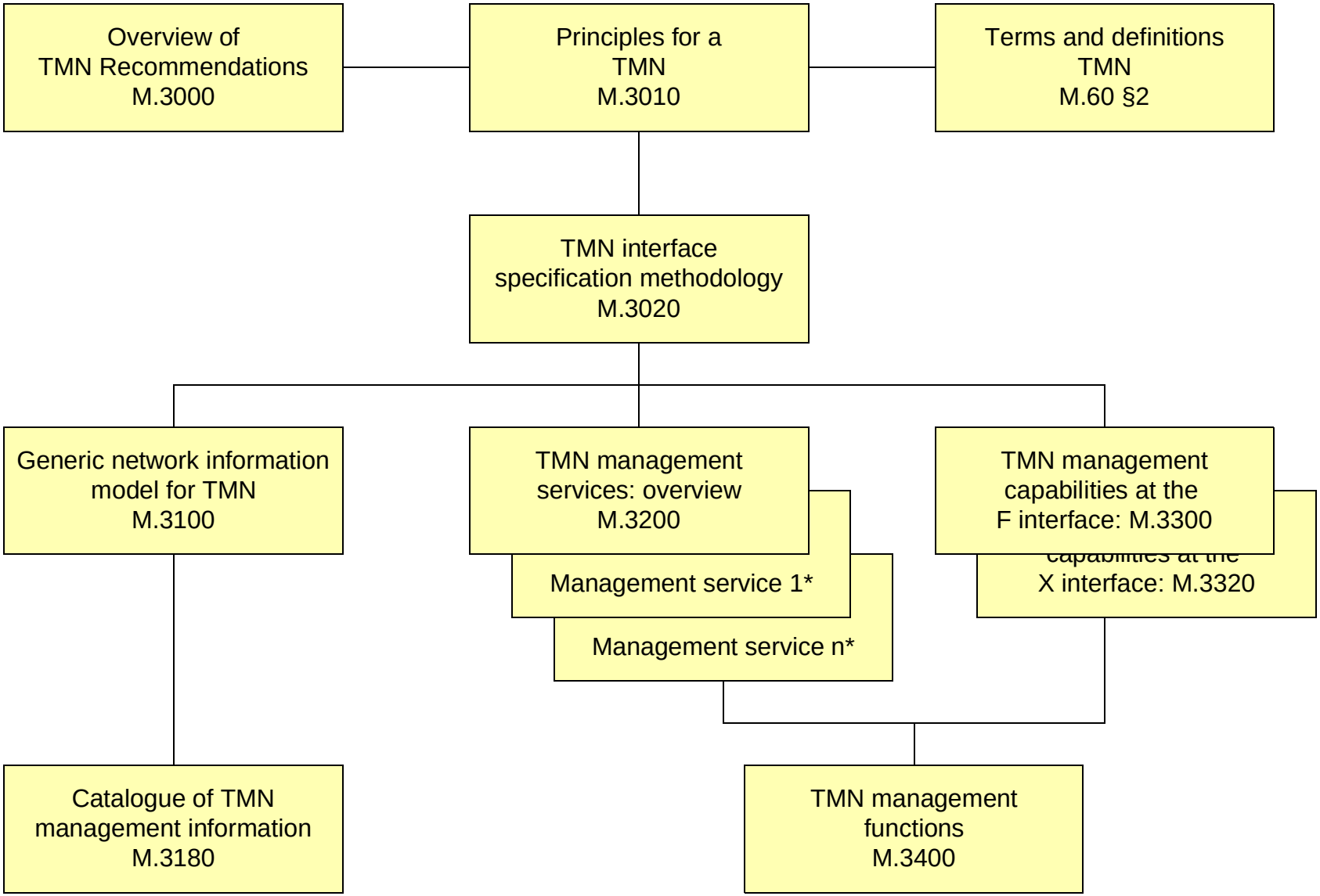
STRUCTURE


TMN
Operations System
Operations System
Operations System
Data Communication Network
Work Station
Exchange
Transmission systems
Exchange
Transmission systems
Exchange
Telecommunication network

STANDARDS

TITLE	NUMBER	DATE
Overview of TMN Recommendations	M.3000	10/94
Principles for a TMN	M.3010	05/96
TMN interface specification methodology	M.3020	07/95
Generic network information model	M.3100	07/95
Managed object conformance statements for the generic network inf. model	M.3101	07/95
Catalogue of TMN management information	M.3180	10/92
TMN Management Services: Overview	M.3200	10/92
TMN management Services: Maintenance aspects of B-ISDN management	M.3207.1	05/96
TMN management Services: Fault and performance mgt. of the ISDN access	M.3211.1	05/96
TMN management capabilities presented at the F interface	M.3300	10/92
Management requirements framework for the TMN X-interface	M.3320	04/97
TMN management functions	M.3400	04/97

STANDARDS: RELATIONSHIP



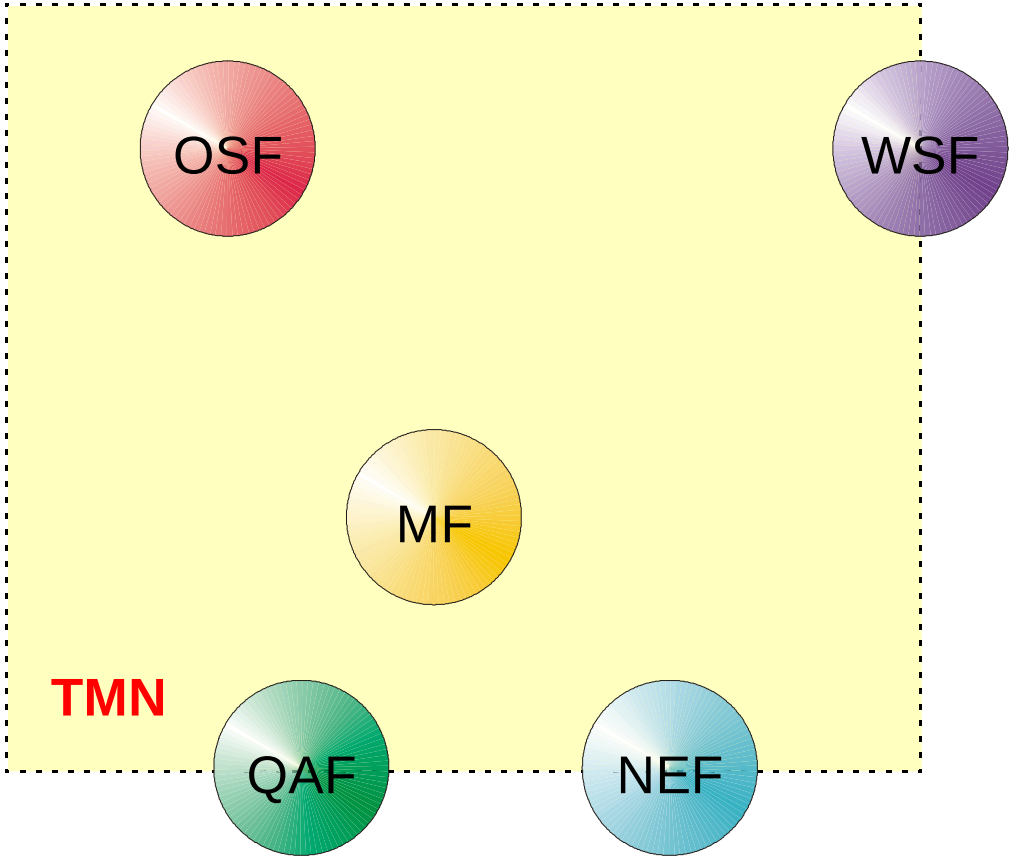
STANDARDS: ISDN

TITLE	NUMBER	DATE
Principles for the management of ISDNs	M.3600	10/92
Application of maintenance principles to ISDN subscriber installations	M.3602	10/92
Application of maintenance principles to ISDN basic rate access	M.3603	10/92
Application of maintenance principles to ISDN primary rate access	M.3604	10/92
Application of maintenance principles to static multiplexed basic rate access	M.3605	10/92
Principles for applying the TMN concept to the management of B-ISDN	M.3610	05/96
Test management of the B-ISDN ATM layer using the TMN	M.3611	04/97
Principles for the use of ISDN test calls, systems and responders	M.3620	10/92
Integrated management of the ISDN customer access	M.3621	07/95
Management of the D-channel - Data link layer and network layer	M.3640	10/92
Management information model for the management of the data link and network layer of the ISDN D channel	M.3641	10/94
Network performance measurements of ISDN calls	M.3650	04/97
ISDN interface management services	M.3660	10/92

ARCHITECTURES

- FUNCTIONAL ARCHITECTURE
- PHYSICAL ARCHITECTURE
- INFORMATION ARCHITECTURE
- LOGICAL LAYERED ARCHITECTURE

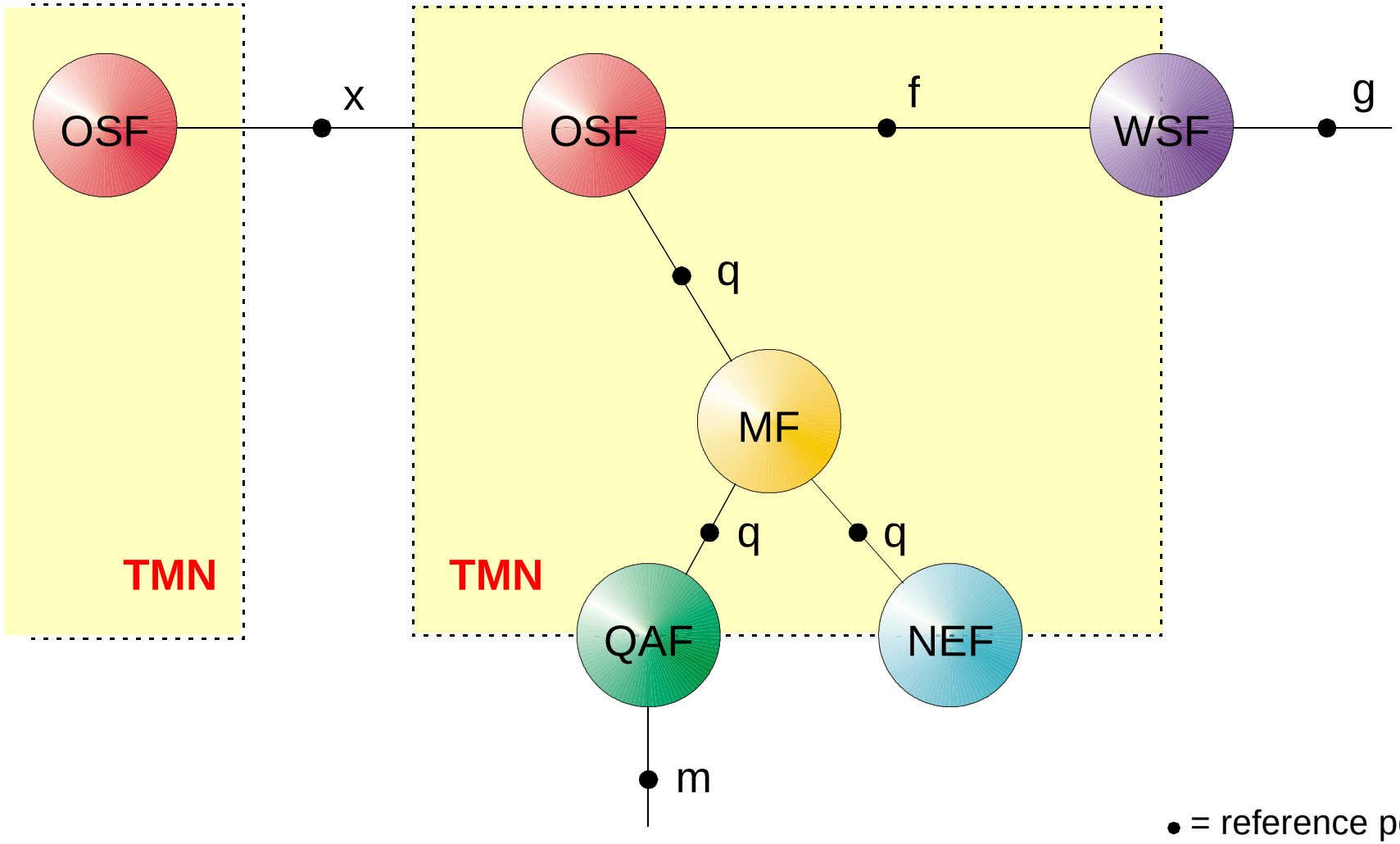
FUNCTIONAL ARCHITECTURE



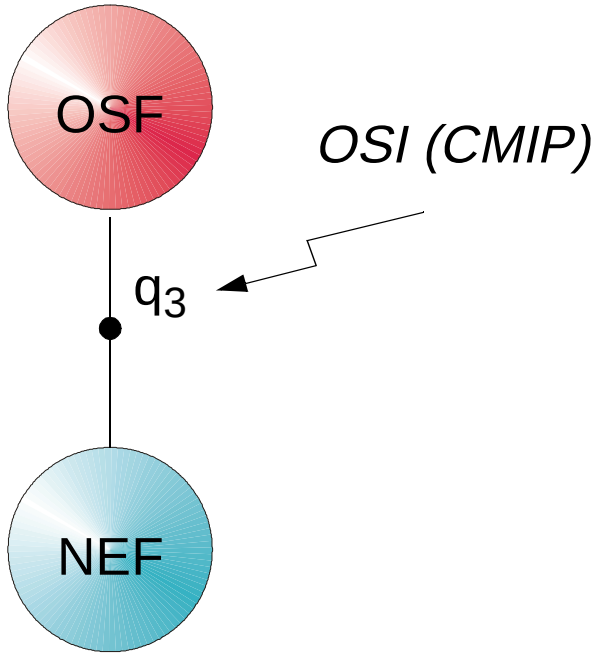
TMN Function blocks:

OSF = Operations System Functions
MF = Mediation Functions
WSF = Work Station Functions
NEF = Network Element Functions
QAF = Q Adaptor Functions

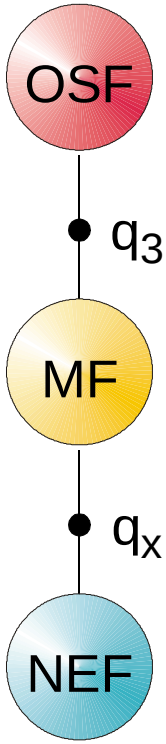
FUNCTIONAL ARCHITECTURE - EXAMPLE



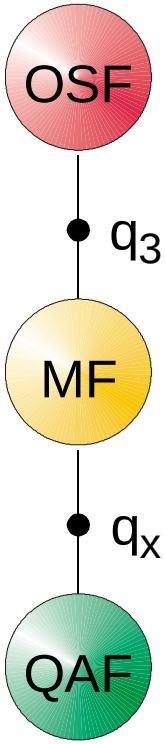
OSF AND NEF



MEDIATION FUNCTIONS

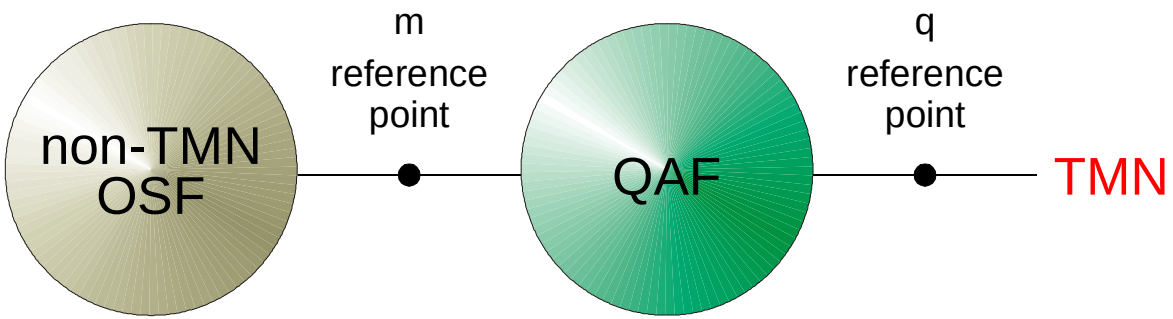


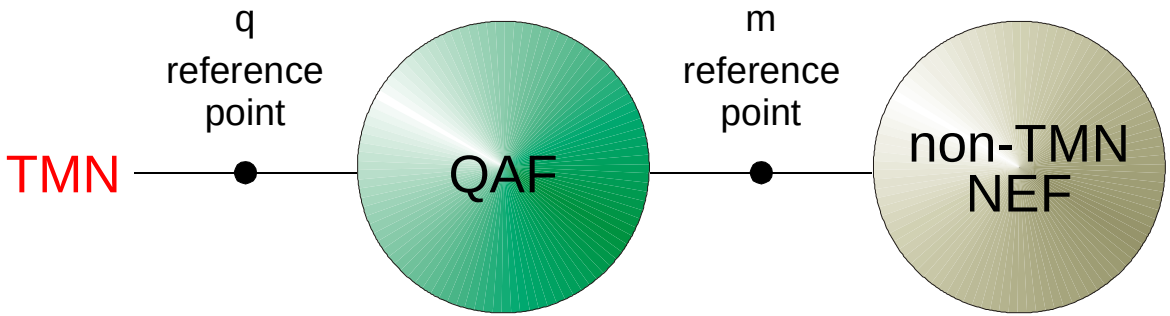
BETWEEN NEF AND OSF



BETWEEN QAF AND OSF

Q ADAPTOR FUNCTIONS





RELATION BETWEEN FUNCTION BLOCKS

	NEF	OSF	MF	QAF_{q3}	QAF_{qx}	WSF	Non-TMN
NEF		q_3	q_x				
OSF	q_3	x*, q_3	q_3	q_3		f	
MF	q_x	q_3	q_x		q_x	f	
QAF_{q3}		q_3					m
QAF_{qx}			q_x				m
WSF		f	f				g**
Non-TMN				m	m	g**	

m, g = non TMN reference points

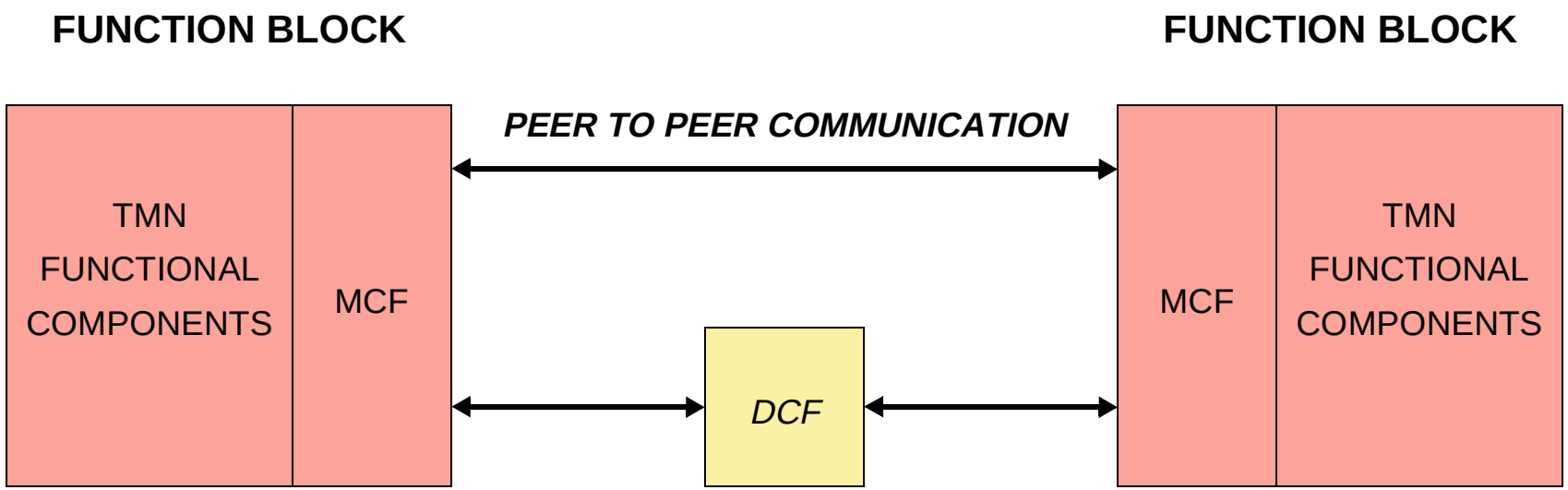
* = x reference point only applies when each OSF is in a different TMN

** = The g reference point lies between the WSF and the human user

FUNCTIONAL COMPONENTS

- MAF: MANAGEMENT APPLICATION FUNCTION
- ICF: INFORMATION CONVERSION FUNCTION
- WSSF: WORKSTATION SUPPORT FUNCTION
- UISF: USER INTERFACE SUPPORT FUNCTION
- MCF: MESSAGE COMMUNICATION FUNCTION
- DSF: DIRECTORY SYSTEM FUNCTION
- DAF: DIRECTORY ACCESS FUNCTION
- SF: SECURITY FUNCTION

FUNCTION BLOCKS & FUNCTIONAL COMPONENTS

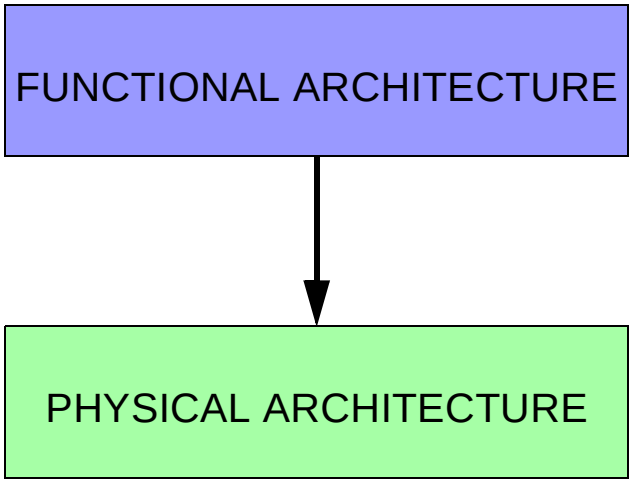


MAPPING BETWEEN FUNCTION BLOCKS & FUNCTIONAL COMPONENTS

	MAF[1]	ICF	WSSF	UISF	DSF	DAF	SF
OSF	M	O	O		O	O	O
WSF	[2]	[2]		M		O	O
NEF q_3	M				O	O	O
NEF q_x	O				O	O	O
MF	O	M	O		O	O	O
QAF q_3	O	M			O	O	O
QAF q_x	O	M			O	O	O

1: MAF is considered to be additional to any Agent or Manager activities and may be inconflict with ISO definitions
2: These functions (or equivalent) may be considered to be as part of the UISF

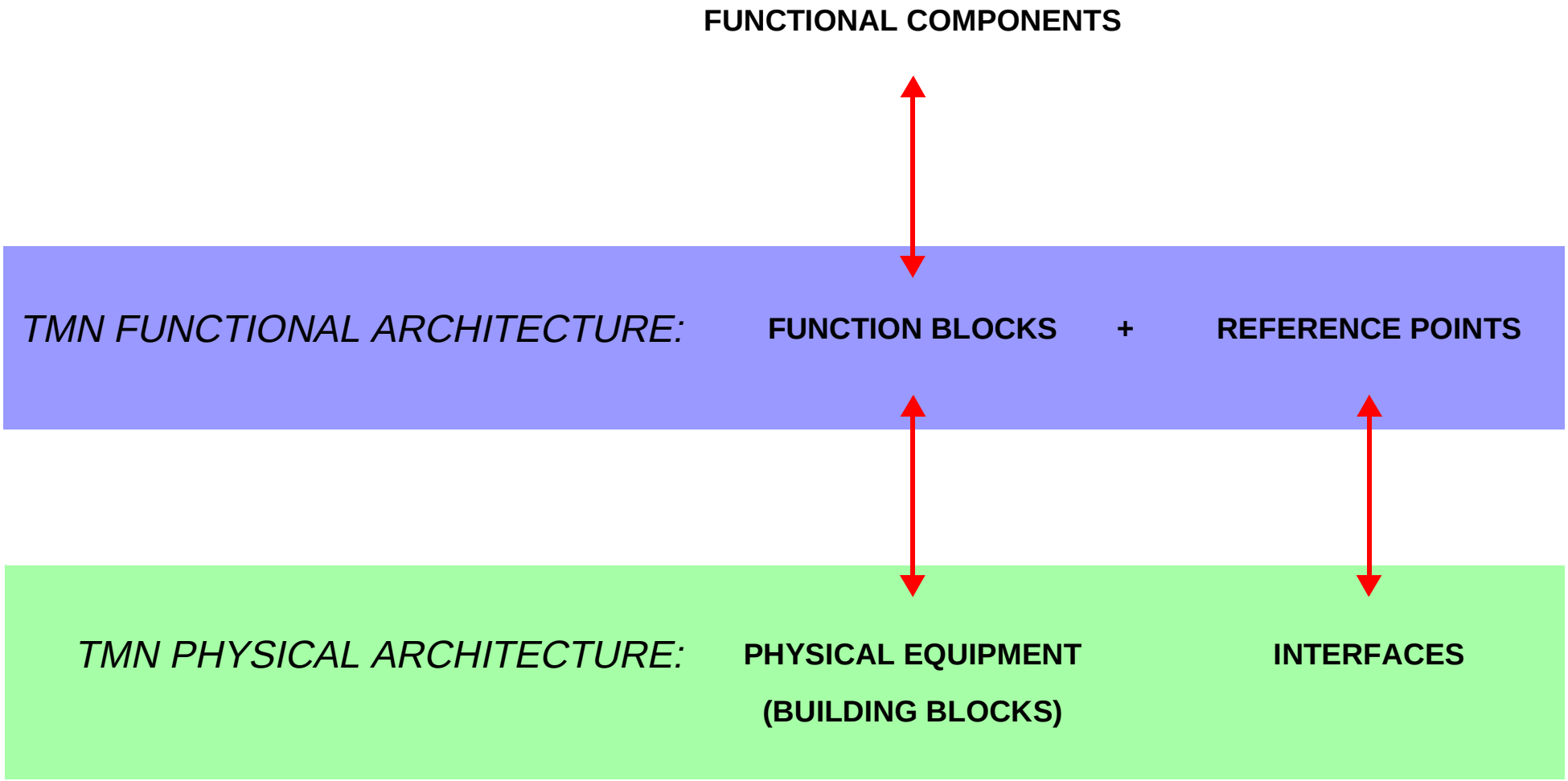
PHYSICAL ARCHITECTURE



DEFINES THE VARIOUS TMN MANAGEMENT FUNCTIONS

DEFINES HOW THE VARIOUS TMN MANAGEMENT FUNCTIONS CAN BE IMPLEMENTED INTO PHYSICAL EQUIPMENT

FUNCTIONAL VERSUS PHYSICAL ARCHITECTURE



FUNCTION BLOCKS VERSUS BUIDING BLOCKS

	NEF	MF	QAF	OSF	WSF
NE	M	O	O	O	O*
MD		M	O	O	O
QA			M		
OS		O	O	M	O
WS					M
DCN					

M = Mandatory
O = Optional
O* = may only be present
if OSF or MF is also present

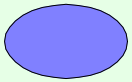
REFERENCE POINTS VERSUS INTERFACES

REFERENCE POINT:	q_x	q_3	x	f	(g	m)
	↓	↓	↓	↓		
INTERFACE:	Q_x	Q_3	X	F		

DRAWING CONVENTIONS:

REFERENCE POINT

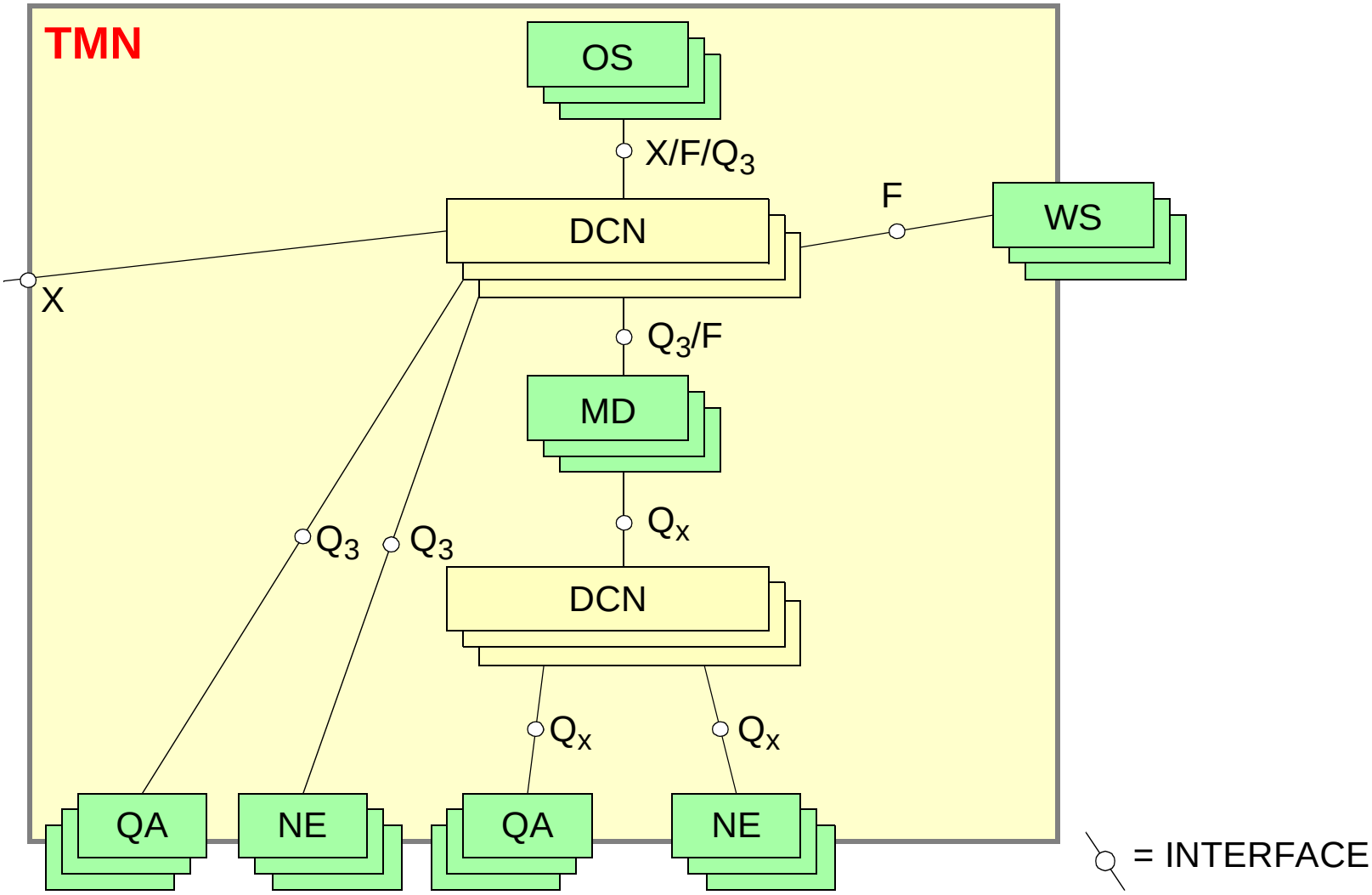
INTERFACE



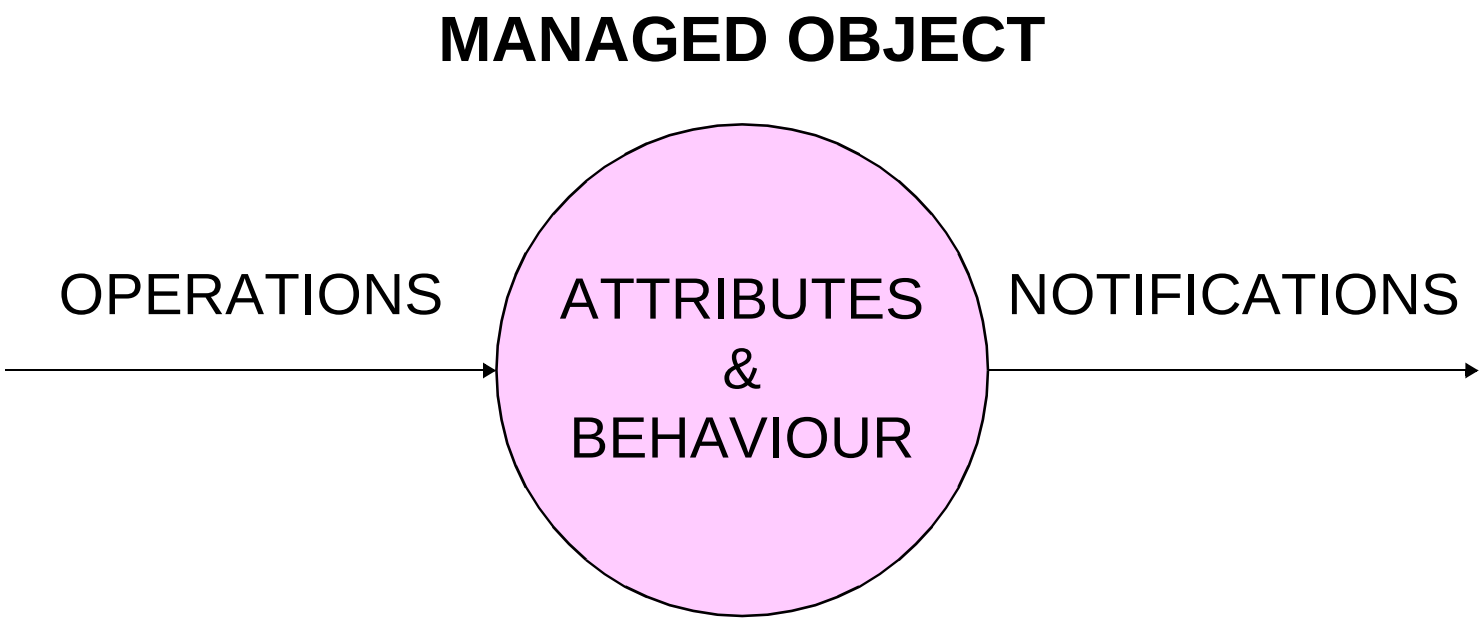
FUNCTION BLOCK

BUILDING BLOCK

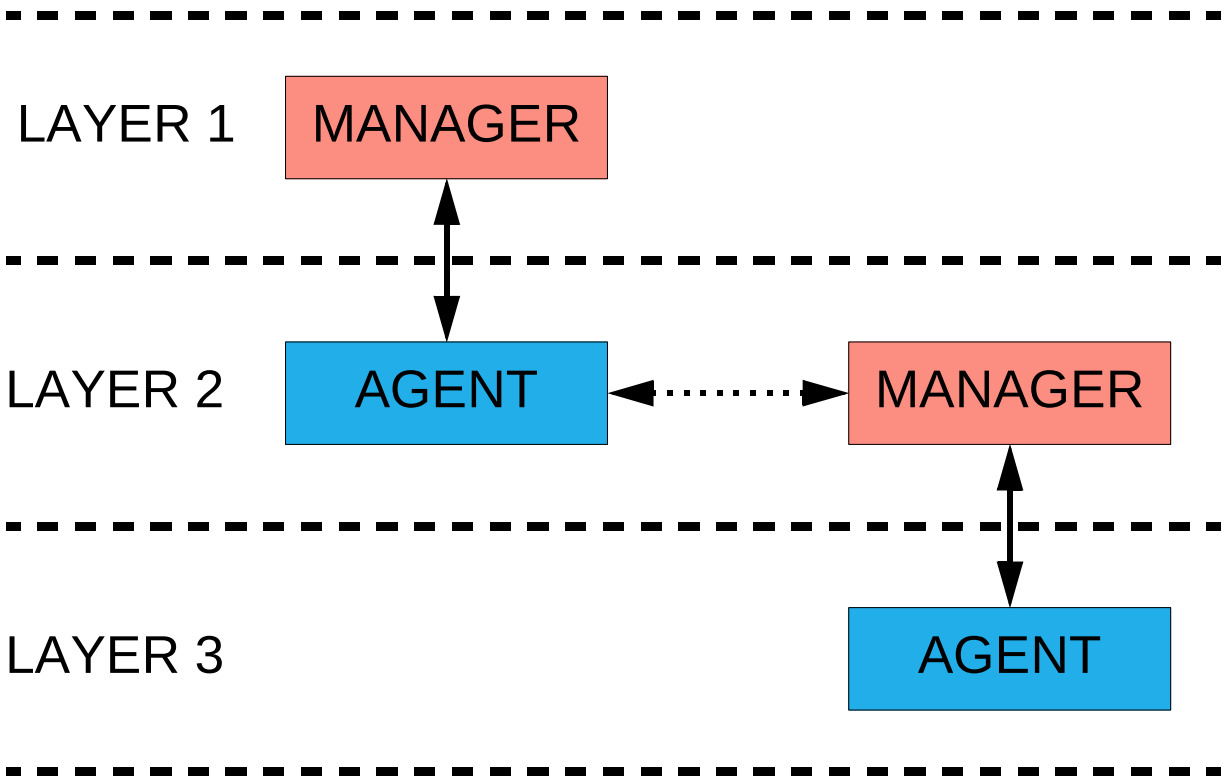
PHYSICAL ARCHITECTURE - EXAMPLE



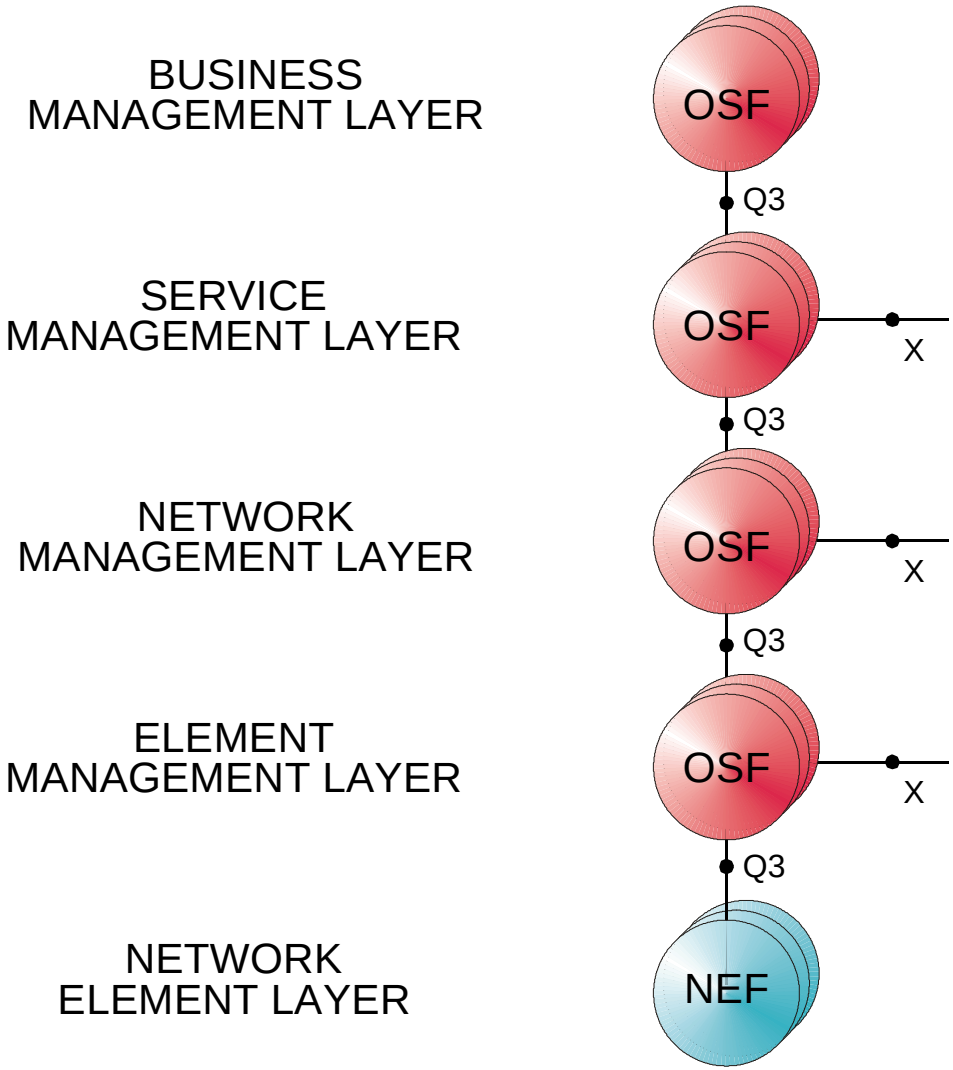
INFORMATION ARCHITECTURE



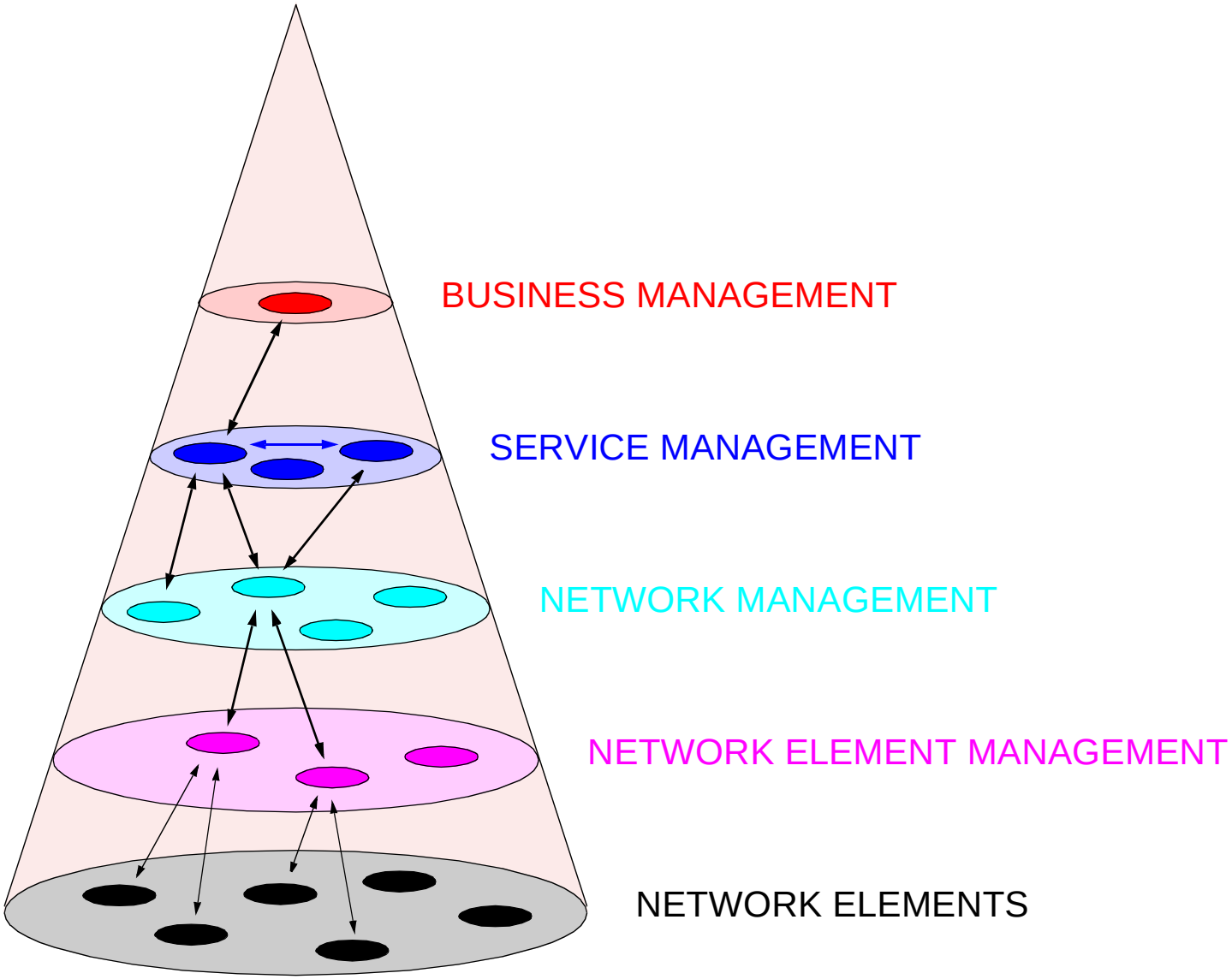
LOGICAL LAYERED ARCHITECTURE



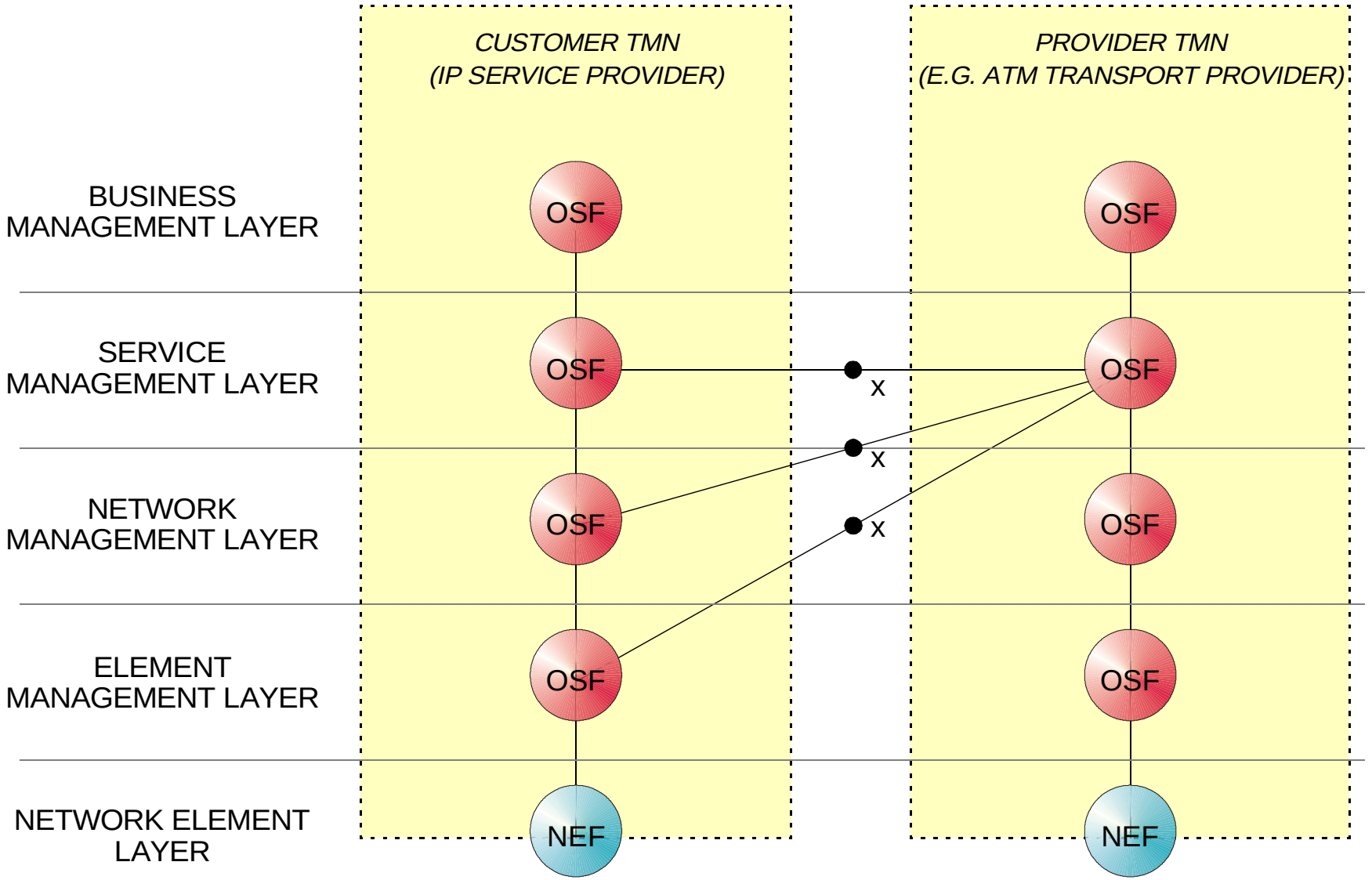
FUNCTIONAL HIERARCHY



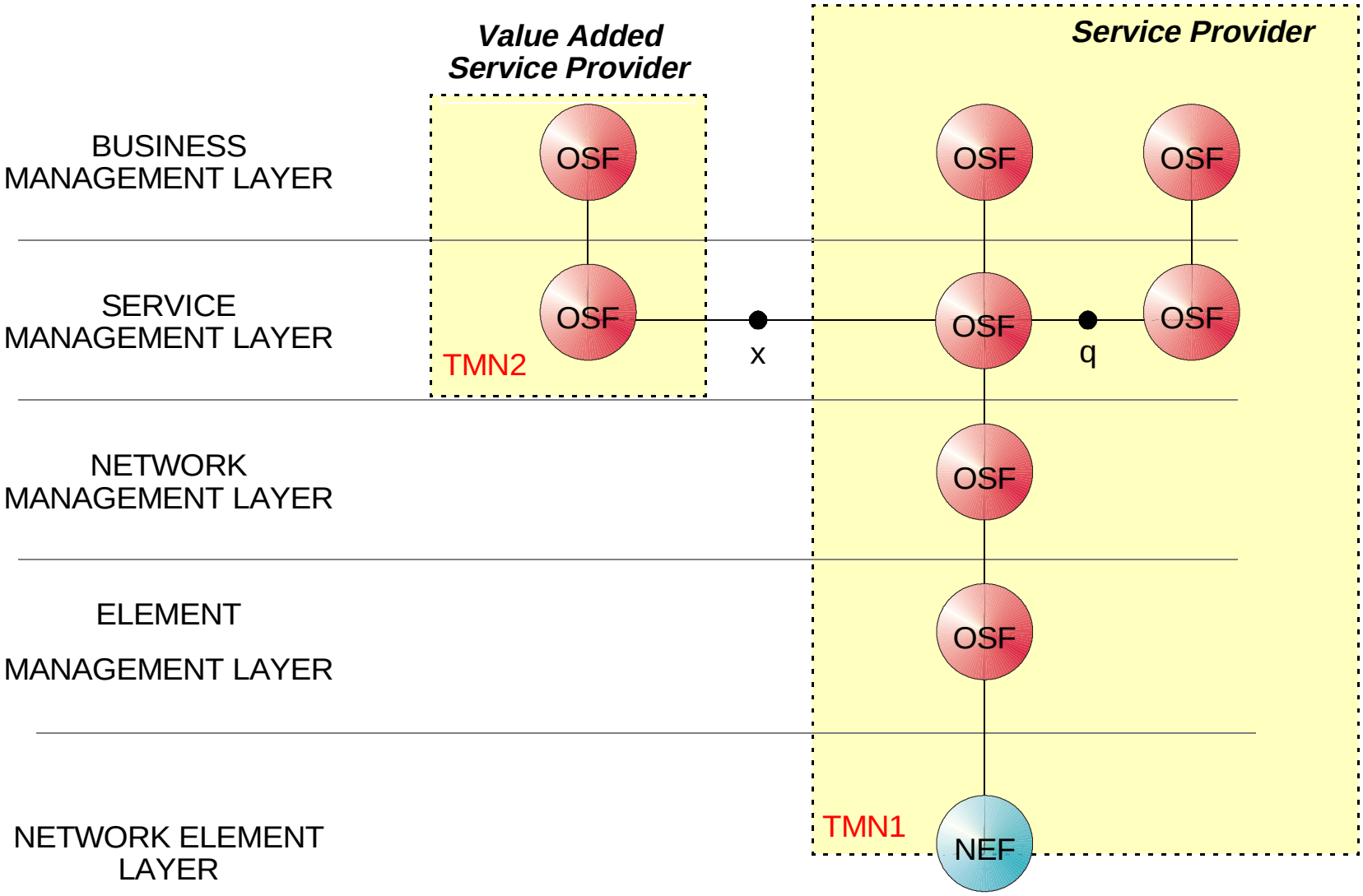
BT's RESPONSIBILITY MODEL



EXAMPLE: ISP WHO USES ATM LINKS



EXAMPLE: VALUE ADDED SERVICES



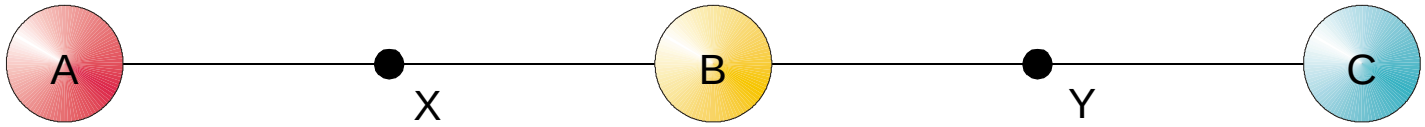
RELATION WITH ISO-OSI

REFERENCE TO ISO MANAGEMENT STANDARDS

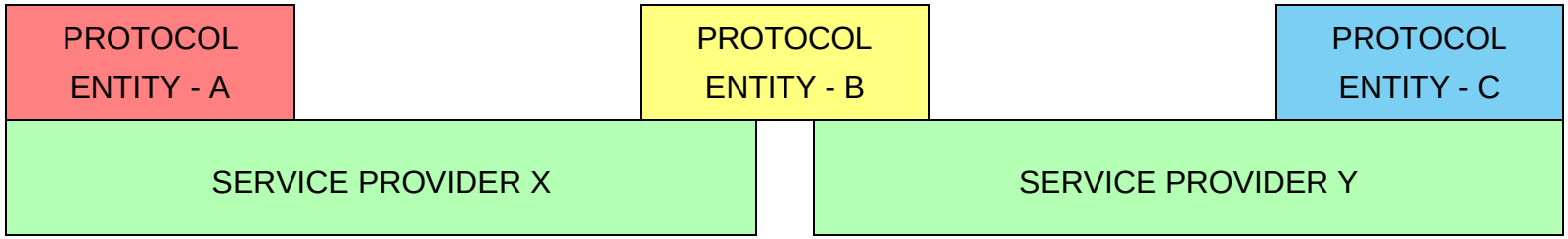
- SAME VIEW OF MANAGER-AGENT CONCEPT
- SAME OO APPROACH
- SAME MANAGEMENT INFORMATION MODEL (INFORMATION ARCHITECTURE)
- SAME PROTOCOLS (CMIP)

TMN VERSUS OSI CONCEPTS

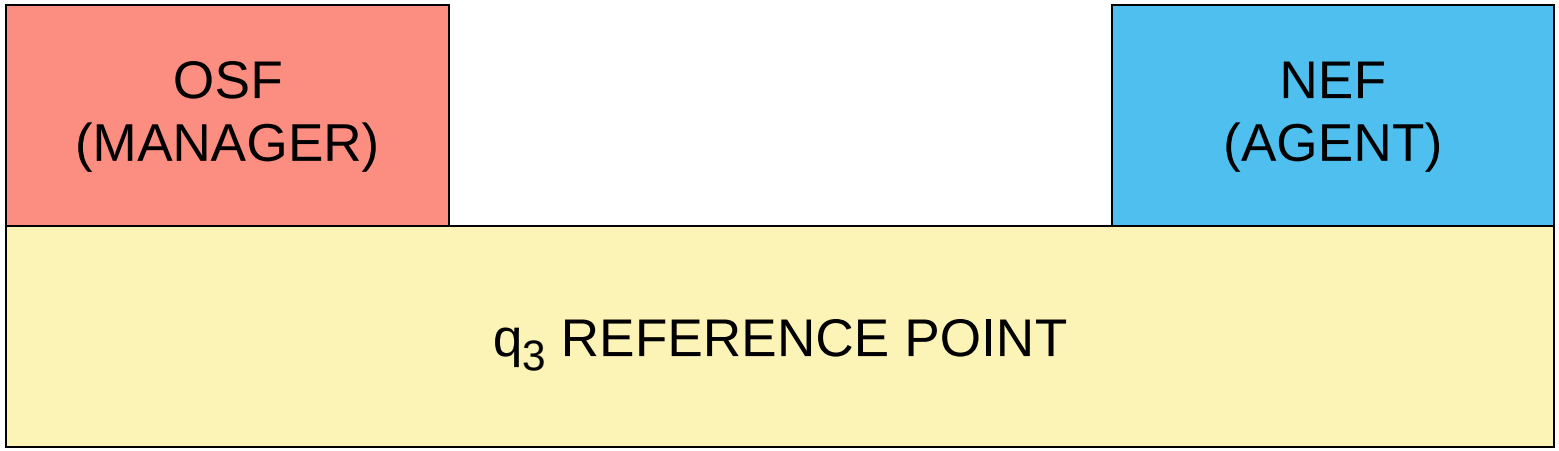
TMN:



OSI:



TMN VERSUS OSI CONCEPTS: OSF & NEF



RELATION WITH SNMP