

NEW APPROACHES

OVERVIEW:

- SNMP USAGE CAN BE DIFFICULT
- EXAMPLE: CONFIGURATION MANAGEMENT

COPS-PR

NETCONF

WEB-SERVICES

SNMP USAGE CAN BE DIFFICULT

EXAMPLE:

1) SELECT / CREATE INDEX

2) SET RowStatus OBJECT TO *createAndWait*

INDEX	COLUMN 1	COLUMN ...	COLUMN N	RowStatus

3) SET COLUMN FIELDS
POSSIBLY INCLUDE IN EVERY SET PDU *snmpSerialNo*

4) SET RowStatus OBJECT TO *active*

IN CASE OF ERRORS
RESTORING A PREVIOUS STATE MAY BE DIFFICULT

FUNDAMENTAL PROBLEM

FOR CONFIGURATION MANAGEMENT
FUNDAMENTAL DESIGN CHOICES MAY BE NON-OPTIMAL:

IF EVERYTHING FAILS, MANAGEMENT SHOULD STILL FUNCTION

NO USE OF TCP

- MESSAGES / OBJECTS ARE LIMITED IN SIZE (SCALARS)
 - GRANULARITY LEVEL MAY BE TOO LOW

NO USE OF EXISTING SECURITY MECHANISMS

- SECURITY / KEY MAINTENANCE IS HARD

MULTIPLE MANAGERS MAY OPERATE CONCURRENTLY

- SYNCHRONIZATION MAY BE HARD

NEW APPROACHES

EVOLUTIONARY

IRTF

- NETWORK MANAGEMENT RESEARCH GROUP (NMRG)
 - SNMP OVER TCP
- EFFICIENT RETRIEVAL OF BULK DATA
 - IMPROVED SMI

IETF

- EVOLUTION OF SNMP (EOS) WG
- SMI NEXT GENERATION (SMIng) WG
- COMMON OPEN POLICY SERVICES PROTOCOL - POLICY PROVISIONING WG

REVOLUTIONARY

IETF

- NETWORK CONFIGURATION (NETCONF) WG
 - XML BASED

RESEARCH COMMUNITY

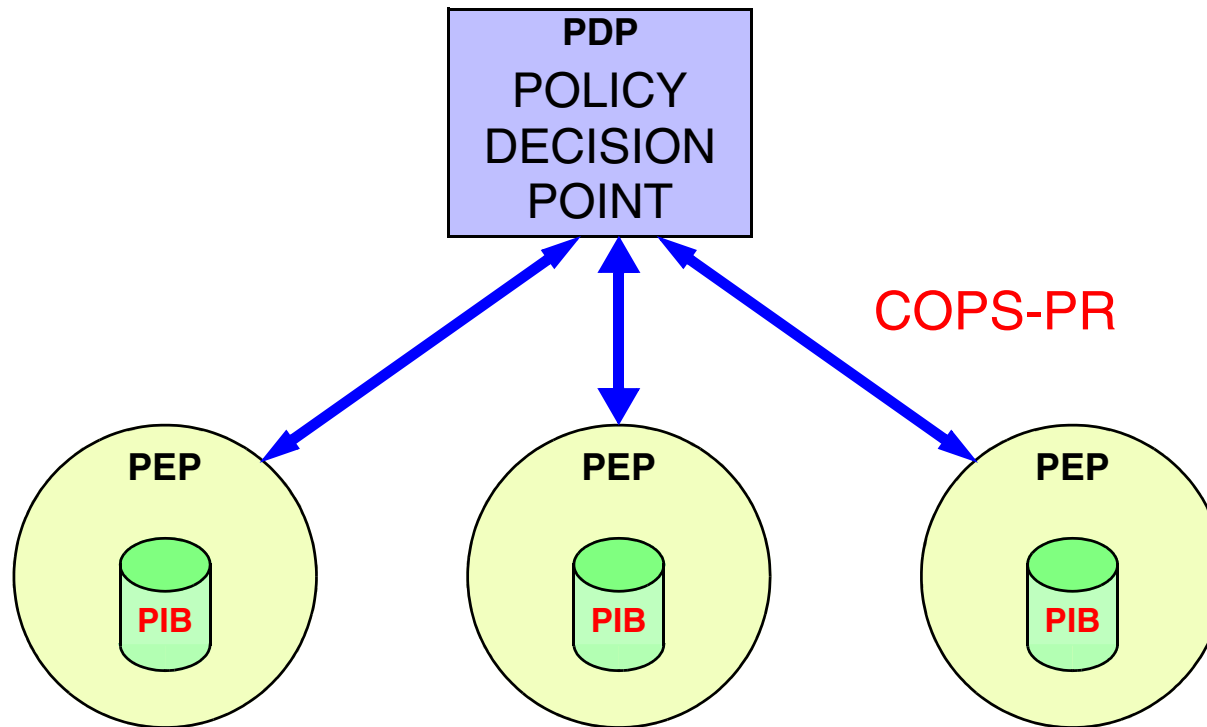
- WEB-SERVICES BASED

COPS-PR

COMMON OPEN POLICY SERVICES PROTOCOL - POLICY PROVISIONING

POLICY INFORMATION BASE

STRUCTURE OF POLICY PROVISIONING INFORMATION
SPPI



COPS-PR

- INTENDED FOR CONFIGURATION MANAGEMENT
 - TECHNOLOGY COMPARIBLE TO SNMP
- OBJECTS HAVE HIGHER GRANULARITY (TABLE ROWS)
- SINGLE OPERATION TO ADD OR DELETE TABLE ROWS
- RELIABLE COMMUNICATION BETWEEN PDP AND PEP (BECAUSE OF TCP)
 - EACH PEP IS CONNECTED TO SINGLE PDP

NETCONF

- INTENDED FOR CONFIGURATION MANAGEMENT
 - BASED ON XML TECHNOLOGY
- OPERATES ON DOCUMENTS, INSTEAD OF OBJECTS
GRANULARITY LEVEL IS THEREFORE HIGH
 - DATA MODEL NOT (YET?) DEFINED
- MULTIPLE OPERATIONS ARE DEFINED
- SECURITY IS PROVIDED AT LOWER LAYERS
USE OF TCP
USE OF EXISTING SECURITY MECHANISMS

NETCONF LAYERED MODEL

LAYERS	EXAMPLE
CONTENT	XML CONFIGURATION DATA
OPERATIONS	<get-config>, <edit-config>
RPC	<rpc>, <rpc-reply>
TRANSPORT	BEEP, SSH, HTTPS

CONFIGURATION DATA:

- COMPLETE SET
 - <RUNNING> CONFIGURATION
 - <STARTUP> CONFIGURATION
 - <CANDIDATE> CONFIGURATION

NETCONF OPERATIONS

- GET-CONFIG (SOURCE, FILTER)
- EDIT-CONFIG(TARGET, OPTIONS, CONFIG)
- COPY-CONFIG(SOURCE, TARGET)
 - DELETE-CONFIG(TARGET)
 - GET(FILTER)
 - VALIDATE(SOURCE)
 - LOCK(SOURCE)
 - UNLOCK(SOURCE)
- COMMIT(CONFIRMED, CONFIRMED-TIMEOUT)