

# ***PoP - An Automated Policy Replacement Architecture for PBNM***

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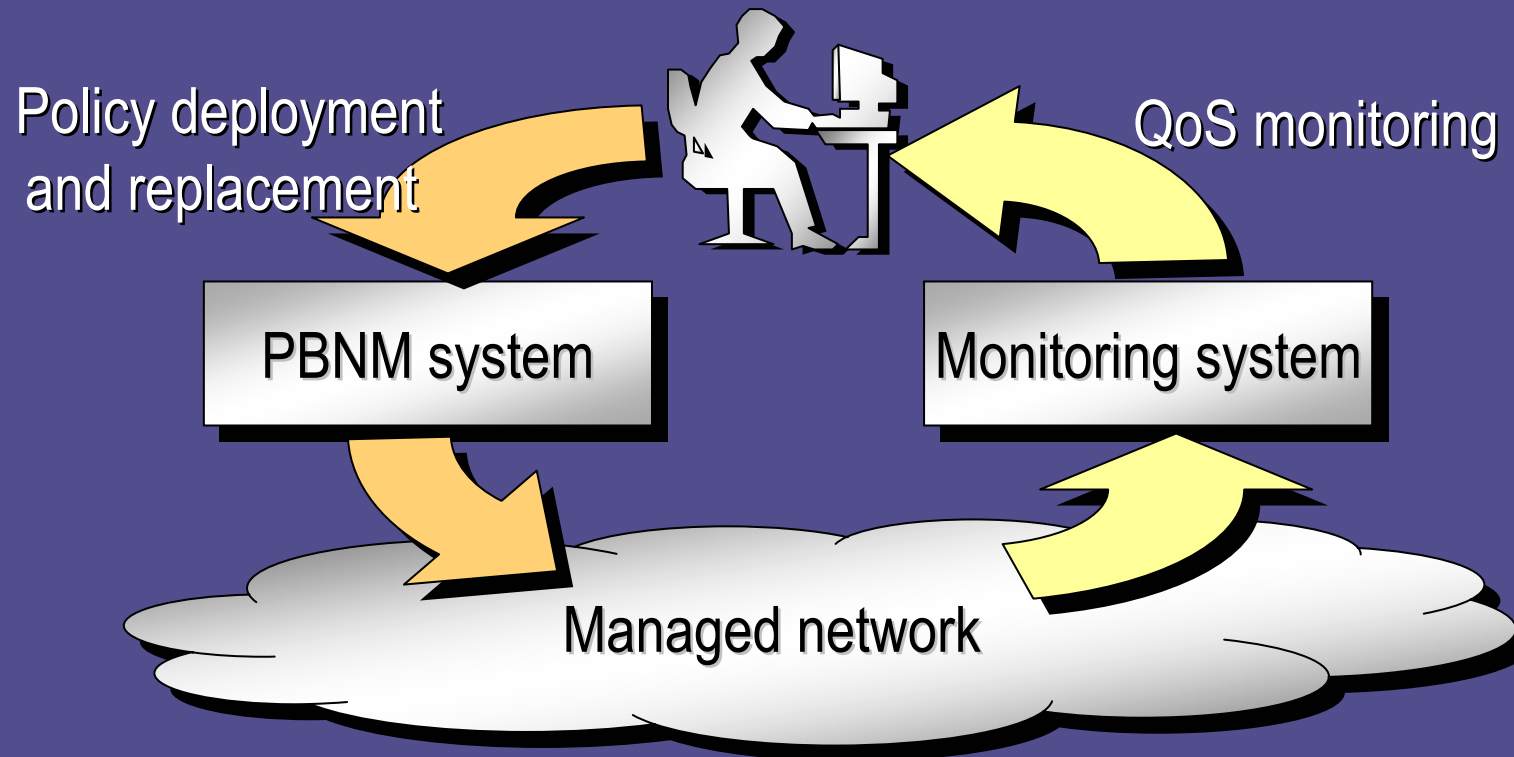
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# Outline

- Motivation
- Policy review
- PoP - Policy of Policies
- PoP architecture
- Conclusions and future work

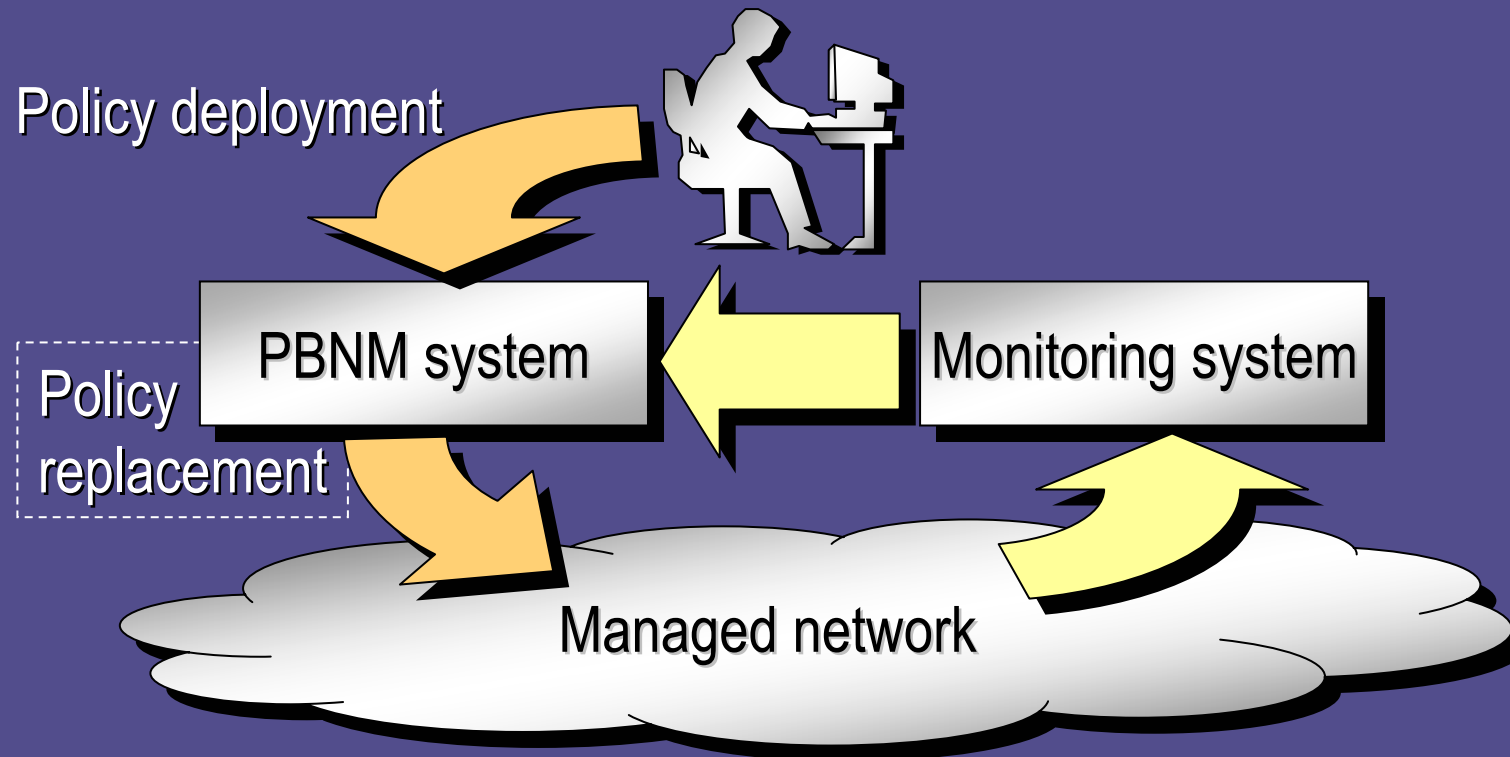
## Motivation

- In QoS-enabled networks, administrators are forced to use different solutions to proceed with policy deployment and QoS monitoring



# Motivation

- How to integrate policy deployment and QoS monitoring?
- How to automate policy replacement?



## *Policy review*

- A policy can be composed by one policy rule, creating a simple policy, or a policy can be composed by two or more policy rules, creating more complex policies
- Composed policies ease the policy maintenance task, since they keep together rules with common goals

# Policy review

- Example: policy composed by four rules

**Rule 1:** ERP and Sales applications receive highest priority  
if (Application = ERP) or (Application = Sales)  
then Priority = 4

**Rule 2:** VoIP  
if (Application = VoIP) and  
((User = executive) or (User = Sales))  
then  
One-Way-Delay < 400ms  
MAX\_BW < 64Kbps ; per call  
MAX\_AGGR\_BW < 512Kbps ; for all calls

**Rule 3:** HTTP traffic from office  
if (Application = HTTP)  
and (User = Executive)  
then  
Up to 256Kbps: Priority = 3  
Up to 0.5Mbps: Priority = 2  
Else : Priority = 1

**Rule 4:** Other is basically best effort  
if (Application = Other)  
then Priority = 0

## *Policy review*

- Administrators are expected to have, even informally, a business plan of actions for the most common degradation situations
- Example:
  - Policy #1 for normal conditions
  - Policy #2 for VoIP degradations
  - Policy #3 for ERP degradations
  - Policy #4 for general problems
  - ...

## *Policy review*

- Policy replacement is a task manually executed by administrators. Besides overloading them, policy replacement can be badly executed or can be delayed because it depends on human intervention
- Although grouping policies allows for keeping rules with common objectives together, there is still a lack of another mechanism that allows the automation of the replacement of such policies when special events are observed

# *PoP - Policy of Policies*

- Our approach:
  - Allow the creation of higher level policies (PoPs) to coordinate the replacement of standard policies
- Thus, PoPs can be seen as meta-policies designed to orchestrate the deployment and replacement of standard QoS policies when special events occur
  - Such special events are typically triggered when problems in previously deployed policies are identified

# *PoP - Policy of Policies*

- PoP requires:
  - References to every possible policy that can be deployed in a policy target (policy #1, #2, #3, #4, ...), either for direct deployment or defined to be the replacement of other policies
  - Identification of events that can trigger a policy replacement

# PoP - Policy of Policies

- PoPs are defined through a finite state machine



S1 script:

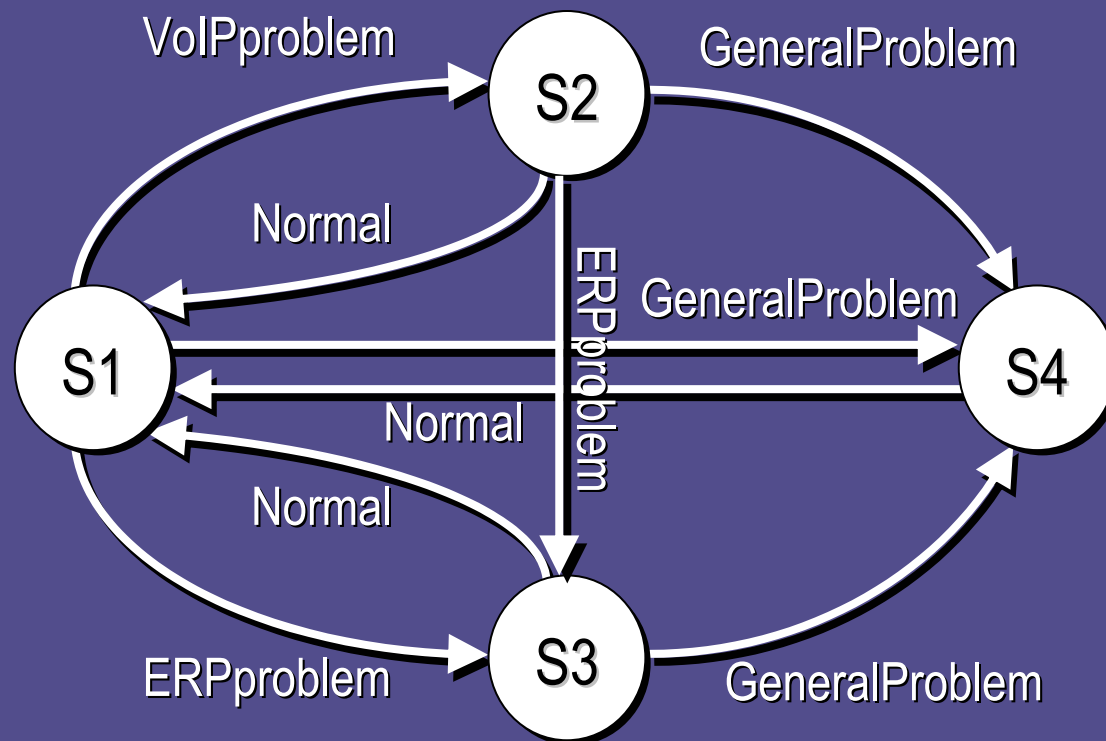
action 1  
action 2  
:  
action n

S2 script:

action 1  
action 2  
:  
action m

# PoP - Policy of Policies

- Example:



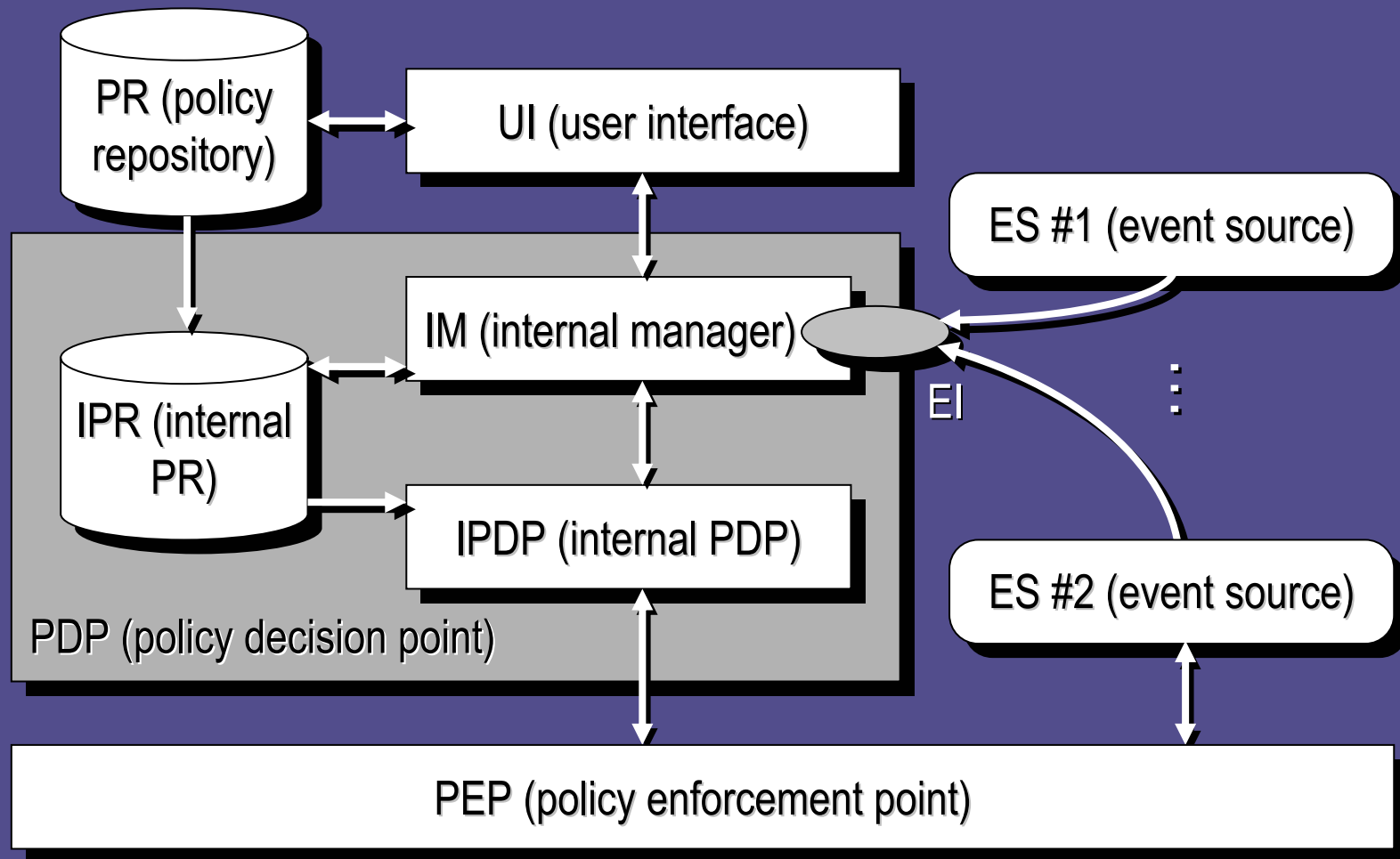
**S1: remove all  
deploy Policy1**

**S2: remove Policy1  
deploy Policy2**

**S3: remove Policy1  
remove Policy2  
deploy Policy3**

**S4: remove all  
deploy Policy4**

# PoP architecture



## Conclusions

- Policy rules and standard policy definition
- PoPs allow the definition of the replacement strategy of policies, while PoP architecture implements the mechanisms needed to proceed with such replacement
- Policies have to be planned in a different way when PoPs are present
- PoPs make the definition of policies more complex, but the current manual replacement of policies is even more complex

## *Future work*

- A prototype for the PoP architecture has to be implemented in order to verify the practical aspects involved in PoP
- PoP and temporal issues still have to be investigated
- Will we have more conflicts with PoP?

# Questions?

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- **Thanks for your attention!**