YESDR

Your Extensible Software Defined Radio

YesDR Technical Specification

YesDR TS 02.006

Version 1.0.0
Release 1

YesDR Policy Control Function (YPCF)

Developed by
Chandhar Research Labs Pvt Ltd
BaSig Wireless Laboratories Pvt Ltd

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1 Scope

This Technical Specification defines the YesDR Policy Control Function (YPCF).

YPCF is responsible for policy decision making related to session management, usage monitoring, QoS enforcement, and charging control within the YesDR core network.

YPCF is conceptually aligned with the 3GPP Policy Control Function defined in TS 23.503 and TS 29.512, with simplified procedures suitable for research, education, and SDR-based deployments.

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2 References

2.1 Normative References

- YesDR TS 01.001: YesDR Overall Architecture
- YesDR TS 02.001: YesDR Core Network Functions

2.2 Informative References

- 3GPP TS 23.503: Policy and Charging Control
- 3GPP TS 29.512: Policy Authorization Services

3 Definitions, Symbols, and Abbreviations

Abbreviation	Description
YPCF	YesDR Policy Control Function
YSMF	YesDR Session Management Function
YUPF	YesDR User Plane Function
CHF	Charging Function
PCC	Policy and Charging Control
QoS	Quality of Service
DNN	Data Network Name
SUPI	Subscription Permanent Identifier

4 Functional Overview

YPCF performs the following functions:

- Session management policy control
- Usage monitoring and quota enforcement
- QoS and traffic throttling decisions
- Charging interaction (optional)
- Policy action triggering (RESET, THROTTLE, BLOCK)

YPCF SHALL expose service-based interfaces over HTTP.

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5 YPCF Architecture

YPCF consists of the following internal components:

- Policy decision engine
- Usage monitoring database
- Charging interaction module (CHF client)
- REST-based service interface

YPCF SHALL maintain persistent storage for session policies and usage counters.

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6 Policy and Usage Data Model

6.1 Session Management Policy

Field	Description
smPolicyId	Unique session policy identifier
SUPI	Subscriber identity
DNN	Data network name
Creation Time	Policy creation timestamp

6.2 Usage Monitoring Data

umId	Usage monitor identifier
Granted Bytes	Quota allocated to UE
Used Bytes	Consumed data volume
Status	ALLOW / THROTTLE / BLOCK
Report Threshold	Usage reporting threshold

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7 Service-Based Interfaces

7.1 Npcf_SMPolicyControl

7.1.1 Create SM Policy

HTTP Method: POST
URI: /sm-policies/{smPolicyId}/create

Input Parameters:

- SUPI
- DNN
- Usage Monitor ID (optional)

Output Parameters:

- SM policy confirmation
- Report threshold

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7.1.2 Usage Report

HTTP Method: POST
URI: /sm-policies/{smPolicyId}/usage-report

Input Parameters:

- Usage monitor reports
- Uplink and downlink byte counts

Output Parameters:

- Policy decisions
- PCC rules for enforcement

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7.1.3 Policy Action

HTTP Method: POST
URI: /sm-policies/{smPolicyId}/action

Supported Actions:

- RESET
- THROTTLE
- BLOCK

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8 Policy Decision Logic

YPCF SHALL evaluate usage reports against granted quotas.

If consumed usage exceeds granted quota:

- YPCF MAY request additional quota from CHF
- YPCF SHALL apply throttling or blocking if quota is exhausted

QoS updates SHALL be communicated to YSMF and YUPF.

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9 Charging Interaction

YPCF MAY interact with a Charging Function (CHF) for:

- Quota reservation
- Usage-based charging

Charging modes MAY include:

- None
- Prepaid
- Offline charging

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10 Security Considerations

YPCF SHALL:

- Validate all policy requests
- Protect usage data integrity
- Use secure transport for service interfaces

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11 Error Handling

YPCF SHALL return appropriate error responses for:

- Unknown session policies
- Invalid usage reports
- Unsupported policy actions

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12 Relationship to 3GPP PCF

YPCF aligns with the functional behavior of the 3GPP PCF while:

- Using simplified REST-based APIs
- Supporting SDR-focused experimentation
- Allowing flexible policy logic for research

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