YesDR Technical Specification

YesDR TS 02.002

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Release 1

YesDR Session Management Function (YSMF)

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Contents

1 Scope

This Technical Specification defines the YesDR Session Management Function (YSMF).

YSMF is responsible for PDU session establishment, modification, and release, IP address allocation, interaction with the User Plane Function (YUPF), and policy enforcement coordination with the Policy Control Function (YPCF).

YSMF is conceptually aligned with the 3GPP Session Management Function (SMF) defined in TS 23.502 and TS 29.244.

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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
- YesDR TS 02.006: YesDR Policy Control Function (YPCF)

2.2 Informative References

- 3GPP TS 23.502: Procedures for the 5G System
- 3GPP TS 29.244: PFCP Specification

3 Definitions, Symbols, and Abbreviations

Abbreviation	Description
YSMF	YesDR Session Management Function
YUPF	YesDR User Plane Function
YPCF	YesDR Policy Control Function
YNRF	YesDR Network Repository Function
PFCP	Packet Forwarding Control Protocol
PDU	Protocol Data Unit
SEID	Session Endpoint Identifier

4 Functional Overview

YSMF performs the following functions:

- PDU session lifecycle management
- UE IP address allocation and management
- PFCP association and session control with YUPF
- Enforcement of policy decisions from YPCF
- Usage reporting and traffic control

YSMF SHALL expose service-based interfaces over HTTP and control-plane interfaces over PFCP.

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5 YSMF Architecture

YSMF consists of the following internal components:

- IP address management module
- PFCP client and PFCP report handler
- Policy interaction client (YPCF)
- NRF registration and heartbeat client
- Session context database

YSMF SHALL register with YNRF and maintain liveness using heartbeat messages :contentReference[oaicite:1]index=1.

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6 PDU Session Management

6.1 PDU Session Establishment

Upon receiving a PDU session request, YSMF SHALL:

1. Validate session parameters
2. Request policy decisions from YPCF
3. Allocate a UE IP address
4. Establish a PFCP session with YUPF
5. Return session parameters to the access network

PFCP Session Establishment SHALL include:

- UE IP address
- F-SEID allocation
- Policy-driven reporting thresholds

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6.2 PDU Session Modification

YSMF SHALL support session modification for:

- QoS changes
- Traffic throttling
- Policy updates from YPCF

Session modifications SHALL be communicated to YUPF using PFCP Session Modification Requests.

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6.3 PDU Session Release

YSMF SHALL release PDU sessions upon:

- UE request
- Policy enforcement decision
- Network-triggered release

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7 PFCP Procedures

YSMF SHALL:

- Establish PFCP association with YUPF
- Send periodic PFCP heartbeats
- Handle unsolicited PFCP Session Reports

Unsolicited PFCP Session Reports SHALL be processed to extract usage information and trigger policy evaluation :contentReference[oaicite:2]index=2.

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8 Policy Interaction

YSMF SHALL interact with YPCF to:

- Create session management policies
- Report usage statistics
- Apply returned PCC rules

Policy decisions MAY result in PFCP session modification to enforce throttling or blocking.

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9 Error Handling

YSMF SHALL handle:

- PFCP association failures
- IP pool exhaustion
- Policy service unavailability
- Invalid session requests

Appropriate error responses SHALL be returned to the requesting entity.

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10 Security Considerations

YSMF SHALL:

- Use secure transport for HTTP-based interfaces
- Validate PFCP message integrity
- Protect session context and IP allocation data

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11 Relationship to 3GPP SMF

YSMF aligns with the functional behavior of the 3GPP SMF while:

- Using simplified PFCP encoding for testbeds
- Supporting research-driven policy experimentation
- Allowing extensible usage reporting mechanisms

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