YesDR Technical Specification

YesDR TS 02.009

Version 1.0.0
Release 1

YesDR Network Repository Function (YNRF)

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Contents

1 Scope

This Technical Specification defines the YesDR Network Repository Function (YNRF).

YNRF provides centralized registration, discovery, and lifecycle management of YesDR Network Functions (NFs) using service-based interfaces.

YNRF is conceptually aligned with the 3GPP Network Repository Function (NRF) defined in TS 29.510, 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 29.510: Network Repository Services
- 3GPP TS 23.501: System Architecture for the 5G System

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3 Definitions, Symbols, and Abbreviations

Abbreviation	Description
YNRF	YesDR Network Repository Function
NF	Network Function
YAMF	YesDR Access Management Function
YSMF	YesDR Session Management Function
YUPF	YesDR User Plane Function
YCRF	YesDR Cognitive Radio Function
YRMF	YesDR Radio Management Function

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4 Functional Overview

YNRF provides the following functions:

- NF registration and deregistration
- NF service capability advertisement
- NF discovery based on NF type and availability
- NF lifecycle state management

YNRF SHALL expose service-based interfaces over HTTP/2.

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5 YNRF Architecture

YNRF consists of the following logical components:

- In-memory NF registry
- REST-based service interface
- NF lifecycle management engine
- Logging and telemetry subsystem

NF registry entries SHALL include NF identity, address, status, supported services, and last update timestamp :contentReference

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6 NF Registration and Deregistration

6.1 NF Registration Procedure

An NF SHALL register with YNRF during startup.

6.1.1 Register NF

HTTP Method: POST
URI: /register_nf

Input Parameters:

- nf_type
- nf_id
- ip
- port
- status
- services (optional)

Output:

- Registration confirmation

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6.2 NF Deregistration

NF deregistration MAY be implicit (timeout) or explicit via release procedures.

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7 Heartbeat Management

Registered NFs SHALL periodically send heartbeat messages to update liveness information.

7.0.1 NF Heartbeat

HTTP Method: POST
URI: /heartbeat_nf
Input Parameters:

- nf_type
- nf_id
- status
- timestamp

YNRF SHALL update the NF registry upon receipt of valid heartbeat messages :contentReference[oaicite:2]index=2.
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8 NF Discovery

8.1 Discover NF

HTTP Method: GET
URI: /get_nf
Query Parameters:

- nf_type

YNRF SHALL return an NF instance with status set to “available”.
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8.2 Discover All NFs

HTTP Method: GET
URI: /get_all_nfs
This interface returns the complete NF registry.
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9 NF Release

9.1 Release NF

HTTP Method: POST
URI: /release_nf
Input Parameters:

- nf_type
- nf_id
- status

Upon release, YNRF SHALL update the NF status and timestamp.
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10 Logging and Telemetry

YNRF SHALL support:

- Local file-based logging
- UDP-based centralized logging
- Timestamped lifecycle event records

Logs SHALL include NF registration, heartbeat, discovery, and error events :contentReference[oaicite:3]index=3.
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11 Error Handling

YNRF SHALL return appropriate error responses for:

- Invalid registration data
- Unknown NF types
- Missing or malformed heartbeat messages

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12 Security Considerations

YNRF SHALL:

- Validate NF identity and registration data
- Protect registry integrity
- Use secure transport where applicable

Unauthorized NF discovery SHALL be restricted.
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13 Relationship to 3GPP NRF

YNRF aligns with the functional behavior of the 3GPP NRF while:

- Using simplified registration and discovery APIs
- Supporting SDR-based research deployments
- Enabling lightweight experimentation

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