Enabler Test Specification for Converged Personal Network Service

Candidate Version 1.0 – 21 Feb 2012

Open Mobile Alliance
OMA-ETS-CPNS-V1_0-20120221-C

Contents

Tables

1. Scope

This document describes in detail available test cases for CNPS 1.0

The test cases are split in two categories, conformance and interoperability test cases.

The conformance test cases are aimed to verify the adherence to normative requirements described in the technical specifications.

The interoperability test cases are aimed to verify that implementations of the specifications work satisfactory.

If either conformance or interoperability tests do not exists at the creation of the test specification this part should be marked not available.

2. References

2.1 Normative References

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

[CPNS-EVP] "Enabler Validation Plan for Converged Personal Network Service", OMA-EVP-CPNS-V1_0, URL:http://www.openmobilealliance.org/

[CPNS-RD] "Converged Personal Network Service Requirements", Open Mobile Alliance™, OMA-RD-CPNS-V1_0, URL:http://www.openmobilealliance.org/

2.2 Informative References

[OMADICT] "Dictionary for OMA Specifications", Version 2.8, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_8, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope”, are normative, unless they are explicitly indicated to be informative.

The following numbering scheme is used:

xxx-y.z-con-number where:

xxx	Name of enabler, e.g. MMS or Browsing
y.z	Version of enabler release, e.g. 1.2 or 1.2.1
’con’	Indicating this test is a conformance test case
number	Leap number for the test case

Or

xxx-y.z-int-number where:

xxx	Name of enabler, e.g. MMS or Browsing
y.z	Version of enabler release, e.g. 1.2 or 1.2.1
’int’	Indicating this test is a interoperability test case
number	Leap number for the test case

3.2 Definitions

CPNS Device	See [CPNS-RD]
CPNS Entity	There are three identified logical entities: PNE, PN GW and CPNS Server. In the CPNS v1.0, the CPNS server entity resides in the core network and the PNE and/or PN GW entity resides in the CPNS device.
Group Key Encryption Key (GKEK)	Key used by PN GW to encrypt Group Key when using broadcast based Group Key delivery from PN GW to PNE.
Group Key Decryption Key (GKDK)	Key used by PNE to decrypt Group Key when using broadcast based Group Key delivery from PN GW to PNE.
Group Owner	A PNE which requests creation of the Service Group or is granted ownership of the Service Group by CPNS Server or former Group Owner. It is authorized to expel member PNE from a Service Group, delete a Service Group and pass the ownership to another PNE.
Mode	See [CPNS-RD]
PN Inventory	See [CPNS-RD]
Secure Storage	A storage that stores the key material (e.g., Entity User Key (EUKey), Group Key, protected Password,…) to protect against unauthorized access
SG Inventory	A list of Service Group(s) and the information of Service Group which includes information of group members.

3.3 Abbreviations

OMA	Open Mobile Alliance
CPNS	Converged Personal Network Service

PR	Problem Report
PNE	Personal Network Element
PN GW	Personal Network Gateway

4. Introduction

The purpose of this document is to provide test cases for CPNS Enabler Release 1.0.

The implementation of some features is optional for the Clients and/or the Servers in the CPNS Enabler. The tests associated with these optional features are marked as "(Includes Optional Features)" in the test specification.

Please refer to [CPNS-EVP] for model details on the enabler, items required to perform the test, protocols used and any other information required to setup and understand the test environment.

5. CPNS Conformance Test Cases

There are no conformance test cases at this time

6. CPNS Interoperability Test Cases

There are ... interoperability test cases

6.1 Authentication

6.1.1 EUKey assignment to PN GW no secure element usage

Test Case Id	CPNS-1.0-int-1
Test Object	PN GW and CPNS Server
Test Case Description	User Registration and EUKey assignment to PN GW without external security
Specification Reference	[TS_Core] section 7.3.1; 6.3.3
SCR Reference	CPNS-EKA-007-C-O, CPNS-MA-C-003-O, CPNS-EKA-S-004-O, CPNS-MA-S-002-O
ETR Reference	AU-006, AU-001
Tool	None
Test code	None
Preconditions	• The PN GW does not use any secure element with pre-installed keys; • The PN GW has UI capable to insert UserID and Password • State: o User is already register by other mechanism o CPNS service is not started
Test Procedure	1. User initiates the CPNS service at the PN GW 2. User enters his UserID and Password in PN GW 3. User requests EUKey assignment; 4. PN GW sends EUKeyAssginmentRequest message; 5. CPNS Server create EUKey and store it with the PN GW ID and User ID of current user of the PN GW 6. CPNS Server sends EUKeyAssignmentResponse message 7. PN GW stores the EUKey 8. PN GW sends the ConnectRequest to the CPNS Server with PN GW ID and random_PN GW; 9. CPNS Server replies with AuthenticateRequest message with random_server ; 10. PN GW creates Session Key and replies with AuthenticateResponse message with PN GW ID and hash_PN GW; 11. CPNS Server creates the Session Key and replies with the ConnectResponse message to the PN GW with the hash_server

Pass-Criteria	1. The CPNS server generates the EUKey, store it correctly and return it to the PN GW 2. The PN GW receives the EUKey and stores it 3. The PN GW successfully authenticates the CPNS Server and vice-versa

Table 1: Test Information for CPNS-1.0-int-1 Interoperability Test

6.1.2 Key Assignment for PNE with UI Capabilities

Test Case Id	CPNS-1.0-int-2
Test Object	PNE, PN GW and CPNS Server
Test Case Description	Key Assignment for PNE with UI Capabilities
Specification Reference	[TS_Core] section 6.3.1
SCR Reference	CPNS-EKA-C-001-O, CPNS-EKA-C-004-O, CPNS-MA-C-001-M, CPNS-MA-C-002-M, CPNS-EKA-S-001-O, CPNS-MA-S-001-M, CPNS-ED-C-001-M, CPNS-ED-C-002-M
ETR Reference	AU-004, CPNSED-001
Tool	None
Test code	None
Preconditions	• The PNE has an UI capable of entering the User ID and Password • State: o User is already registered at the CPNS server o The PN GW and CPNS Server were already mutually authenticated
Test Procedure	1. PNE enters detection range of PN GW; 2. One of both, PNE or PN GW, sends Entity Discovery Request to the other; 3. The requesting entity requests user to insert User ID and Password; 4. The second entity, PN GW or PNE respectively, replies with Entity Discovery Response; 5. PNE request the EUKey to the PN GW via a EUKeyAssignmentRequest message 6. The PN GW relays the EUKeyAssignmentRequest message to the CPNS Server 7. The CPNS Server authenticates the user, creates and stores the EUKey and sends a EUKeyAssignmentResponse message to PN GW 8. The PN GW relays the EUKeyAssignmentResponse message to the PNE 9. The PNE stores the EUKey

Pass-Criteria	1. PN GW detects PNE 2. PNE captures the user credentials and forward them to the PN GW 3. The CPNS server generates the EUKey, store it and return it to the PNE 4. The PNE receives the EUKey and stores it

Table 2: Test Information for CPNS-1.0-int-2 Interoperability Test

6.1.3 Key Assignment for PNE w/o UI Capabilities secure PAN

Test Case Id	CPNS-1.0-int-3
Test Object	PNE, PN GW and CPNS Server
Test Case Description	Key Assignment for PNE without UI Capabilities when PAN is secure
Specification Reference	[TS_Core] section 6.3.2.1
SCR Reference	CPNS-EKA-C-002-O, CPNS-EKA-C-005-O, CPNS-EKA-S-002-O, CPNS-MA-C-001-M, CPNS-MA-C-002-M, CPNS-IPR-C-001-O, CPNS-IPR-S-001-O, CPNS-MA-S-001-M, CPNS-ED-C-001-M, CPNS-ED-C-002-M
ETR Reference	AU-002, AU-005, CPNSED-001
Tool	None
Test code	None
Preconditions	• The PNE has no UI capability to enter the User ID and Password • The PNE and PN GW are on a secure PAN • State: o CPNS User is already registered into the CPNS Server; o The PN GW and CPNS Server were already mutually authenticated o The PNE is already paired and authenticated with the PN GW but still has no information about Entity

Test Procedure	1. PNE enters detection range of PN GW 2. One of both, PNE or PN GW, sends Entity Discovery Request to the other; 3. The requesting entity requests user to insert User ID and Password; 4. The second entity, PN GW or PNE respectively, replies with Entity Discovery Response; 5. CPNS User initiates at the PN GW the PNE EUKey Assignment; 6. The PN GW sends ID_PWDRegistrationRequest message with encrypted User ID and Password 7. The CPNS Server responds with ID_PWDRegistrationResponse message; 8. The PN GW sends the ID & Password Installation Request Message to the PNE 9. The PNE stores the received User ID and hash of user-password on a Secure Storage in the PNE and sends an ID & Password Response to the PN GW with information about how to handling 10. The PN GW sends a EUKeyAssignmentTrigger message to the PNE 11. The PNE verifies successfully that the trigger is sent by the user of the PNE and sends back the EUKeyAssignmentRequest message to the PN GW; 12. The PN GW relays the EUKeyAssignmentRequest message to the CPNS Server; 13. The CPNS verifies the EUKeyAssignmentRequest message and generates the KEK and the PNE EUKey 14. The CPNS Server sends the EUKeyAssignmentResponse to the PN GW with handling information, security information and encrypted PNE EUKey with KEK; 15. The PN GW relays the EUKeyAssignmentResponse message to the PNE; 16. The PNE generates the KEK, decrypts the PNE EUKey and stores it on a Secure Storage.
Pass-Criteria	1. The PN GW discovers the PNE or vice-versa 2. The CPNS server stores the User ID and hash of user password 3. The CPNS server successfully generate the PNE EUKey and KEK 4. The PNE stores at a Secure Storage the user-id and hash of the user password 5. The PNE stores at a Secure Storage the PNE EUKey

Table 3: Test Information for CPNS-1.0-int-3 Interoperability Test

6.1.4 Key Assignment for PNE w/o UI Capabilities not secure PAN

Test Case Id	CPNS-1.0-int-4
Test Object	PNE, PN GW and CPNS Server
Test Case Description	Key Assignment for PNE without UI Capabilities when PAN is not secure

Specification Reference	[TS_Core] section 6.3.2.2
SCR Reference	CPNS-EKA-C-003-O, CPNS-EKA-C-006-O, CPNS-MA-C-001-M, CPNS-MA-C-002-M, CPNS-EKA-S-003-O, CPNS-MA-S-001-M, CPNS-ED-C-001-M, CPNS-ED-C-002-M
ETR Reference	AU-005, CPNSED-001
Tool	None
Test code	None
Preconditions	• The PNE has no UI capability to enter the User ID and Password • The PAN where the PN GW and PNE are is not secure • State: o CPNS User is already registered into the CPNS Server; o The PN GW and CPNS Server were already mutually authenticated o The PNE is already paired but not authenticated with the PN GW and still has no information about Entity
Test Procedure	1. PNE enters detection range of PN GW 2. One of both, PNE or PN GW, sends Entity Discovery Request to the other; 3. The requesting entity requests user to insert User ID and Password; 4. The second entity, PN GW or PNE respectively, replies with Entity Discovery Response; 5. CPNS User initiates at the PN GW the PNE EUKey Assignment 6. The PN GW relays the EUKeyAssignmentRequest message to the CPNS Server with CPNS User ID and PNE EntityID with hashed user password; 7. The CPNS Server verifies the EUKeyAssignmentRequest message and generates and stores the PNE EUKey or set of PNE's EUKeys; 8. The CPNS Server receives the Temporary Key; 9. The CPNS Server sends the EUKeyAssignmentResponse to the PN GW with Temporary Key and PNE EUKey or set of PNE's EUKeys; 10. The PN GW stores Temporary Key and EUKey or set of PNE's EUKeys and sends the EUKeyAssignmentNotification message to the PNE with PNE's keys encrypted by PNE's Temporary key; 11. The PNE decrypts the EUKey with the Temporary Key and stores the EUKey securely.
Pass-Criteria	1. The PN GW successfully detects the PNE or vice-versa 2. The CPNS server successfully generate the PNE EUKey, receives the Temporary Key and stores the EUKey, User ID and Entity ID on the secure storage; 3. The PN GW stores securely the PNE Temporarily Key and PNE's EUKeys; 4. The PNE stores at a Secure Storage the PNE EUKey

Table 4: Test Information for CPNS-1.0-int-4 Interoperability Test

6.2 PN Management

6.2.1 PN Establishment

6.2.1.1 PNE Initiated

Test Case Id	CPNS-1.0-int-5
Test Object	PNE_W/UI, PNE_N/UI, PN GW and CPNS Server
Test Case Description	PN Establishment initiated by the PNE
Specification Reference	[TS_Core] section 7.6.1.1, 7.6.1.2
SCR Reference	CPNS-PNM-C-001-M, CPNS-PNM-C-002-M, CPNS-PNM-C-011-M, CPNS-MA-C-001-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M,CPNS-MA-C-002-M, CPNS-PNM-S-001-M, CPNS-PNM-S-002-M CPNS-PMETA-S-001-M
ETR Reference	PNM-001
Tool	None
Test code	None
Preconditions	• PNE_W/UI has UI, PNE_N/UI has no UI • The PNE_N/UI, PNE_W/UI and PN GW are physically paired; • PAN between PNE_N/UI, PNE_W/UI and PN GW is not secure • State: o User is already register at the CPNS Server o PN GW is already authenticated on the CPNS Server o The Entity Discovery was already made o All devices have already their own EUKey

Test Procedure	1. User starts the PN Establishement at PNE_W/UI; 2. PNE_W/UI sends a PNSetupRequest to the PN GW with device capabilities and "All" as type of PN Setup and the correct AuthIniData for authentication; 3. PN GW sends the PNSetupRequest message to PNE_N/UI; 4. PNE_N/UI accepts the request and sends the PNSetupResponse message to PN GW with the correct AuthIniData for authentication purposes; 5. PN GW creates the PN Inventory with routing tables and sends PNSetupRequest to the CPNS Server with both AuthIniData; 6. CPNS Server creates and ciphers LocalEUKey_PNE_W/UI and TemporaryEUKey_PNE_N/UI and sends one AuthenticationRequest message to the PN GW; 7. PN GW decrypts the Local and Temporary EUKeys by using it own EUKey and stores them; 8. PN GW relays in one AuthenticationRequest message to PNE_W/UI including LocalEUKey encrypted by PNE_W/UI EUKey and one AuthenticationRequest message to PNE_N/UI including the TemporaryEUKey encrypted by PNE_N/UI EUKey, both including a random_PN_GW; 9. PNE_W/UI creates a session key from random_PNE and random_PN_GW and PNE_W/UI EUKey. It also decrypts and stores the LocalEUKey and replies with AuthenticationResponse message including the hash value calculated from the PNSetupRequest, AuthenticationRequest and PNE_W/UI EUKey; 10. PNE_N/UI creates a session key from random_PNE and random_PN_GW and PNE_N/UI EUKey. It also decrypts and stores the TemporaryEUKey and replies with AuthenticationResponse message including the hash value calculated from the PNSetupRequest, AuthenticationRequest and PNE_N/UI EUKey; 11. PN GW relays one aggregated AuthenticationResponse message to the CPNS Server; 12. CPNS Server confirms session key and hash values for each PNE, register the PN Inventory and sends PNSetupResponse to the PN GW with both hash_serverPNE_N/UI and hash_serverPNE_W/UI; 13. PN GW stores the PN Inventory locally and sends PNSetupResponse message to PNE_WUI and PNEstablishementNotify message to PNE_NUI, each one with the PN Inventory and the respective hash server; 14. Each PNE authenticates the CPNS Server by verifying the respective hash_server and stores then and the PN Inventory
Pass-Criteria	1. The CPNS server, the PN GW, PNE_N/UI and PNE_W/UI store correctly the PN Inventory within each of them.

Table 5: Test Information for CPNS-1.0-int-5 Interoperability Test

6.2.1.2 PN GW Initiated

Test Case Id	CPNS-1.0-int-6
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PN Establishment initiated by the PN GW
Specification Reference	[TS_Core] section , 7.6.1.1, 7.6.1.2
SCR Reference	CPNS-PNM-C-002-M, CPNS-PNM-C-012-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-001-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • PNE has no UI and its TemporaryEUKey is available • PAN between PNE and PN GW is not secure • State: o User is already register at the CPNS Server o PN GW is already authenticated on the CPNS Server o The Entity Discovery was already made o All devices have already their own EUKey

Test Procedure	1. User starts the PN Establishement at PN GW; 2. PN GW sends a PNSetupRequest to the PNE with device capabilities and "All" as type of PN Setup; 3. PNE accepts the request with PNSetupResponse message to PN GW with the correct AuthIniData for authentication purposes; 4. PN GW creates the PN Inventory with routing tables and sends PNSetupRequest to the CPNS Server; 5. CPNS Server gets TemporaryEUKey and sends it ciphered with within an AuthenticationRequest message to the PN GW; 6. PN GW decrypts and stores the TemporaryEUKey and relays the AuthenticationRequest message to PNE with TemporaryEUKey ciphered with PNE EUKey; 7. PNE creates a session key from random_PNE and random_PN_GW and PNE EUKey. It also decrypts and stores the TemporaryEUKey and replies with AuthenticationResponse message including the hash value calculated from the PNSetupRequest, AuthenticationRequest and PNE EUKey; 8. PN GW relays the AuthenticationResponse message to the CPNS Server; 9. CPNS Server calculates session key and server_hash for the PNE, register the PN Inventory and sends PNSetupResponse to the PN GW with hash_serverPNE; 10. PN GW stores the PN Inventory locally and sends PNEstablishementNotify message to PNE with the PN Inventory and the respective hash server; 11. The PNE authenticates the CPNS Server by checking hash_server and stores the PN Inventory
Pass-Criteria	1. The CPNS server, the PN GW and PNE store correctly the PN Inventory within each of themselves.

Table 6: Test Information for CPNS-1.0-int-6 Interoperability Test

6.2.2 PNE Management

6.2.2.1 PN GW Inviting

Test Case Id	CPNS-1.0-int-7
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PNE Management PN GW inviting
Specification Reference	[TS_Core] section 7.6.2.1
SCR Reference	CPNS-PNM-C-005-M, CPNS-PNM-C-014-M, CPNS-PNM-C-016-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, , CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None

Preconditions	• The PNE and PN GW are physically paired; • PAN between PNE and PN GW is not secure • State: o User is already register at the CPNS Server o PN GW is already authenticated on the CPNS Server o The Entity Discovery was already made o All devices have already their own EUKey
Test Procedure	1. User triggers at the PN GW the PNE Invitation; 2. PN GW sends a PNActionRequest to the PNE with Command 2; 3. PNE accepts the request with PNActionResponse message to PN GW with the correct AuthIniData for authentication purposes; 4. PN GW sends PNActionRequest to the CPNS Server with the AuthIniData; 5. CPNS Server gets TemporaryEUKey or generates LocalEUKey depending of UI capabilities and sends it ciphered within an AuthenticationRequest message to the PN GW to authenticate invited PNE; 6. PN GW stores LocalEUKey or TemporaryEUKey and forward AuthenticationRequest message to PNE including random_PN_GW; 7. PNE generates session key and send hash value it within a Authentication Response to the PN GW; 8. PN GW creates session key and verifies PNE hash value. After it forwards the Authentication Response to the CPNS Server; 9. CPNS Server verifies the PNE hash value, updates the PN inventory and generates the session key and hash server. It sends a PNUpdateResponse to the PN GW; 10. PN GW updates the PN Inventory and send a PNActionResponse to the PNE 11. PNE verifies the hash server to authenticate the CPNS server and update the PN inventory
Pass-Criteria	1. The CPNS server, the PN GW and PNE store correctly the PN Inventory within each of themselves.

Table 7: Test Information for CPNS-1.0-int-7 Interoperability Test

6.2.2.2 PNE Inviting

Test Case Id	CPNS-1.0-int-8
Test Object	PNE1, PNE2, PN GW and CPNS Server
Test Case Description	PNE Management PNE inviting
Specification Reference	[TS_Core] section 7.6.2.1

SCR Reference	CPNS-PNM-C-004-M, CPNS-PNM-C-015-M, CPNS-PNM-C-016-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-002-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None
Preconditions	• The PNE1, PNE2 and PN GW are physically paired; • State: o User is already register at the CPNS Server o The Entity Discovery was already made o All devices have already their own EUKey
Test Procedure	1. PNE1 sends PNActionRequest message with Command 2; 2. PN GW sends a PNActionRequest to the PNE2; 3. PNE2 replies with PNActionResponse message to PN GW 4. PN GW sends PNUpdateRequest to the CPNS Server; 5. CPNS Server sends AuthenticationRequest message to PN GW to authenticate invited PNE2 6. PN GW forward AuthenticationRequest message to PNE2; 7. If PAN not secure perform the local authentication between PN GW and PNE2 as described in previous test cases 8. PNE2 generates the authentication data using the EUKey and sends the AuthenticationResponse to the CPNS Server via PN GW 9. PN GW forwards the Authentication Response to the CPNS Server; 10. PN GW sends PNUpdateNotification to PNE1 including PNE2 information 11. PNE1 and PNE2 update their own PN inventory
Pass-Criteria	1. PNE2 is correctly added to the PN by being visible on the PN Inventories existing on the PNE1, PNE2, PN GW and CPNS Server

Table 8: Test Information for CPNS-1.0-int-8 Interoperability Test

6.2.2.3 PNE Joining

Test Case Id	CPNS-1.0-int-9
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PNE Management PNE Joining
Specification Reference	[TS_Core] section 7.6.2.2
SCR Reference	CPNS-PNM-C-006-M, CPNS-PNM-C-017-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-003-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None

Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User is already register at the CPNS Server o The Entity Discovery was already made and PNE has the list of 1 or more PNs the PN GW belongs to o All devices have already their own EUKey
Test Procedure	1. User requests PNE join a specific PN by trigger the sending of aPNActionRequest message with Command 1 to PN GW identifying the target PN; 2. PN GW sends PNUpdateRequest to the CPNS Server; 3. CPNS Server sends AuthenticationRequest message to PN GW to authenticate invited PNE; 4. PN GW forward AuthenticationRequest message to PNE; 5. If PAN not secure then perform mutual authentication between PNE and PN GW as described in previous test cases; 6. PNE generates the authentication data using the EUKey and sends the AuthenticationResponse to the CPNS Server via PN GW 7. PN GW forwards the Authentication Response to the CPNS Server; 8. CPNS Server updates the PN inventory; 9. CPNS Server sends PNUpdateResponse message to the PN GW 10. PN GW updates the PN inventory 11. PN GW sends the PNActionResponse message to the PNE; 12. PNE updates the PN inventory.
Pass-Criteria	1. PNE is correctly added to the correct PN into the PN inventory at the CPNS Server, PN GW and PNE.

Table 9: Test Information for CPNS-1.0-int-9 Interoperability Test

6.2.2.4 PNE Leaving

Test Case Id	CPNS-1.0-int-10
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PNE Management PNE Leaving
Specification Reference	[TS_Core] section 7.6.2.4
SCR Reference	CPNS-PNM-C-009-M, CPNS-PNM-C-019-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-005-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None

Preconditions	• The PNE and PN GW are physically paired; • State: o User is already register to the CPNS Server o All devices have already their own EUKey o PNE is part of a PN and there is no reason for avoiding it from leaving
Test Procedure	1. User requests at PNE to leave a specific PN 2. PNE sends PNActionRequest message with Command 3 to PN GW; 3. PN GW sends PNUpdateRequest to the CPNS Server; 4. CPNS Server updates the PN Inventory; 5. CPNS Server sends PNUpdateResponse message to the PN GW; 6. PN GW updates the PN inventory; 7. PN GW sends PNActionResponse to the PNE; 8. PNE updated the PN inventory.
Pass-Criteria	1. PNE is correctly removed from the PN inventory at the CPNS Server, PN GW and PNE

Table 10: Test Information for CPNS-1.0-int-10 Interoperability Test

6.2.2.5 PNE Expulsion

Test Case Id	CPNS-1.0-int-11
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PNE Management PNE Expulsion
Specification Reference	[TS_Core] section 7.6.2.3
SCR Reference	CPNS-PNM-C-008-M, CPNS-PNM-C-018-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-004-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User is already register at the CPNS Server o All devices have already their own EUKey o PNE is part of a PN

Test Procedure	1. User requests PN GW to send PNActionRequest message with Command 1 to PNE; 2. PN GW sends PNUpdateRequest to the CPNS Server; 3. CPNS Server updates the PN Inventory; 4. CPNS Server sends PNUpdateResponse message to the PN GW; 5. PN GW updates the PN inventory;
Pass-Criteria	1. PNE is correctly removed from the PN inventory at the CPNS Server, and PN GW

Table 11: Test Information for CPNS-1.0-int-11 Interoperability Test

6.2.2.6 PN Release

6.2.2.6.1 PN GW Initiated

Test Case Id	CPNS-1.0-int-12
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PN Release PN GW Initiated
Specification Reference	[TS_Core] section 7.6.3
SCR Reference	CPNS-PNM-C-010-M, CPNS-PNM-C-020-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-006-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User is already register at the CPNS Server o All devices have already their own EUKey o PNE is part of a PN
Test Procedure	1. User requests at the PN GW to send PNReleaseRequest message to CPNS Server; 2. CPNS Server updates the PN Inventory; 3. CPNS Server sends PNReleaseResponse message to the PN GW; 4. PN GW updates the PN inventory; 5. PN GW sends PN Release Notification to PNE 6. PNE updates the PN inventory.
Pass-Criteria	1. The PN is effectively released and confirmed it was removed from the PN inventory on the PN GW, CPNS Server and PNE.

Table 12: Test Information for CPNS-1.0-int-12 Interoperability Test

6.2.2.6.2 PNE Initiated

Test Case Id	CPNS-1.0-int-13
Test Object	PNE, PN GW and CPNS Server
Test Case Description	PN Release PNE Initiated
Specification Reference	[TS_Core] section 7.6.3
SCR Reference	CPNS-PNM-C-010-M, CPNS-PNM-C-020-M, CPNS-PMETA-C-001-M, CPNS-PMETA-C-002-M, CPNS-PNM-S-006-M, CPNS-PMETA-S-001-M
ETR Reference	PNM-002
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User is already register o All devices have already EUKey o PNE is part of a PN
Test Procedure	1. User requests at PNE to send PNReleaseRequest message to PN GW; 2. PN GW sends PNReleaseRequest message to CPNS Server; 3. CPNS Server removes PNE from the PN Inventory; 4. CPNS Server sends PNReleaseResponse message to the PN GW; 5. PN GW updates the PN inventory; 6. PN GW sends PN Release Notification to PNE 7. PNE updates the PN inventory
Pass-Criteria	1. The PN is effectively released and confirmed it was removed from the PN inventory on the PN GW, CPNS Server and PNE.

Table 13: Test Information for CPNS-1.0-int-13 Interoperability Test

6.3 Group Management

6.3.1 Service Group creation

Test Case Id	CPNS-1.0-int-14
Test Object	PNE1, PNE2, PN GW1, PN GW2 and CPNS Server
Test Case Description	Service Group created by PNE with PNE invited
Specification Reference	[TS_Core] section 7.7.1

SCR Reference	CPNS-SGM-C-001-M, CPNS-SGM-C-006-M, CPNS-SMETA-C-001-M, CPNS-SMETA-C-002-M, CPNS-SGM-C-012-M, CPNS-SGM-S-001-M, CPNS-SMETA-S-001-M
ETR Reference	SGM-001
Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are members of one PN and PNE2 and PN GW2 are members of another PN • State: o PNE1 has a list of services available
Test Procedure	1. User chooses a service and requests the creation of a Service Group; 2. PNE1 creates SG inventory and sends a SGCreateRequest message to the PN GW1 with PNEID of PNE2; 3. PN GW1 forwards the request to the CPNS Server; 4. CPNS Server assigns SGID; 5. CPNS Server sends SGInviteRequest to PN GW 2 that will forward to PNE2; 6. PNE2 replies to the PN GW 2 with SGInviteResponse; 7. PN GW 2 forwards the SGInviteResponse to the CPNS Server 8. CPNS Server creates the SG inventory and the Group Key and delivers them to the PNE1 and PNE2 via PN GW1 and PN GW2 respectively; *Note: There are specific test cases for the Group Key delivery* 9. CPNS Server requests the service and sends the notification to the service provider that a SG was created; 10. CPNS Server receives the answer from 3rd party service provider; 11. CPNS Server send SGChangeNotification to PN GW 2 12. PN GW 2 stores the SG Inventory and forwards the SG Change Notification to PNE2; 13. PNE2 stores the SG Inventory ; 14. CPNS Server sends the SGCreateResponse to PN GW1; 15. PN GW1 stores the list of PNEs which joined the Service Group; 16. PN GW1 forwards the SGCreatedResponse to PNE1; 17. PNE1 stores on the SG Inventory;
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2, PNE1 and PNE2 store correctly the SG Inventory with the 4 entities;

Table 14: Test Information for CPNS-1.0-int-14 Interoperability Test

6.3.2 Service Group Invitation

Test Case Id	CPNS-1.0-int-15

Test Object	PNE1, PNE2, PN GW1, PN GW2(optional) and CPNS Server
Test Case Description	PNE2 invited to join PNE1 owned Service Group
Specification Reference	[TS_Core] section 7.7.2.1, 7.7.2.4
SCR Reference	CPNS-SGM-C-002-M, CPNS-SGM-C-003-M, CPNS-SGM-C-006-M, CPNS-SGM-C-008-M, CPNS-SGM-C-016-M, CPNS-SGM-C-017-M, CPNS-SMETA-C-001-M, CPNS-SMETA-C-002-M, CPNS-SGM-C-013-M, CPNS-SGM-S-002-M, CPNS-SGM-S-005-M, CPNS-SGM-S-006-M, CPNS-SMETA-S-001-M
ETR Reference	SGM-002, SGM-006
Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are members of one PN. PNE2 can be of the same PN or with an optional PN GW2 be members of another PN. • State: o PNE1 owns an existent Service Group o PNE2 can be added to the PNE1 SG
Test Procedure	1. User chooses at PNE1 to invite PNE2 to his Service Group; 2. PNE1 sends a SGInviteRequest message to the PN GW1 with PNEID of PNE2; 3. PN GW1 forwards the request to the CPNS Server; 4. CPNS Server sends SGInviteRequest to PNE2's PN GW that will forward to PNE2; 5. PNE2 replies to its PN GW with SGInviteResponse; 6. PNE2's PN GW forwards the SGInviteResponse to the CPNS Server 7. CPNS Server delivers the SG inventory and the Group Key to the PNE1 and PNE2 via PN GW1 and PN GW2 respectively; 8. CPNS Server send SGChangeNotification to PNE2's PN GW; 9. PNE2's PN GW stores or updates the SG Inventory and forwards the SGChange Notification to PNE2; 10. PNE2 stores the SG Inventory ; 11. CPNS Server sends the SGInviteResponse to PN GW1; 12. PN GW1 updates SG Inventory; 13. PN GW1 forwards the SGInviteResponse to PNE 1; 14. PNE1 stores PNE2 its SG Inventory;
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2 (if used), PNE1 and PNE2 have a correct version of the SG Inventory with all the 4 entities;

Table 15: Test Information for CPNS-1.0-int-15 Interoperability Test

6.3.3 Service Group Expulsion

Test Case Id	CPNS-1.0-int-16

Test Object	PNE1, PNE2, PN GW1, PN GW2(optional) and CPNS Server
Test Case Description	PNE2 expel from PNE1 owned Service Group
Specification Reference	[TS_Core] sections 7.7.2.2, 7.7.2.4
SCR Reference	CPNS-SGM-C-004-M, CPNS-SGM-C-005-M, CPNS-SGM-C-008-M, CPNS-SMETA-C-001-M, CPNS-SMETA-C-002-M, CPNS-SGM-C-014-M, CPNS-SGM-C-016-M, CPNS-SGM-C-017-M, CPNS-SGM-S-003-M, CPNS-SGM-S-005-M, CPNS-SGM-S-006-M, CPNS-SMETA-S-001-M
ETR Reference	SGM-003, SGM-006
Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are members of one PN. PNE2 can be of the same PN or with an optional PN GW2 be members of another PN. • State: o PNE1 owns an existent Service Group o PNE2 is part of PNE1 SG o PNE1 can expel PNE2
Test Procedure	1. User chooses at PNE1 to expel PNE2 from his Service Group; 2. PNE1 sends a SGActionRequest message with action attribute “1” (Expel) to the PN GW1 with PNEID of PNE2; 3. PN GW1 forwards the request to the CPNS Server; 4. CPNS Server sends SGActionNotification to PN GW managing PNE2 that will forward it to PNE2; 5. PNE2 removes itself from its own SG Inventory; 6. PN GW 2 forwards the SGInviteResponse to the CPNS Serve 7. CPNS Server updates its own SG Inventory; 8. CPNS Server sends a SGActionResponse message to PN GW 1 with the Result attribute; 9. PN GW 1 updates the SG Inventory and forwards the SGActionResponse to PNE1; 10. PNE1 removes PNE2 from its SG Inventory; 11. CPNS Server sends SGChangeNotification to both PN GWs; 12. Both PN GWs update their SG Inventory; 13. PN GWs send SGChangeNotification to both PNEs; 14. Both PNEs update their SG Inventory.
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2, PNE1 have a correct version of the SG Inventory with only the entities still belonging to the SG; 2. PNE2 no longer has the SG from PNE1 on its own SG Inventory.

Table 16: Test Information for CPNS-1.0-int-16 Interoperability Test

6.3.4 Service Group Join

Test Case Id	CPNS-1.0-int-17
Test Object	PNE1, PNE2, PN GW1, PN GW2(optional) and CPNS Server
Test Case Description	PNE2 joins PNE1 owned Service Group
Specification Reference	[TS_Core] section 7.7.2.3, 7.7.2.4
SCR Reference	CPNS-SGM-C-006-M, CPNS-SGM-C-008-M, CPNS-SMETA-C-001-M, CPNS-SMETA-C-002-M, CPNS-SGM-C-015-M, CPNS-SGM-C-016-M, CPNS-SGM-C-017-M, CPNS-SGM-S-004-M, CPNS-SGM-S-005-M, CPNS-SGM-S-006-M, CPNS-SMETA-S-001-M
ETR Reference	SGM-004
Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are members of one PN. PNE2 can be of the same PN or with an optional PN GW2 be members of another PN. • State: o PNE1 owns an existent Service Group o PNE2 is not part of PNE1 SG o PNE2 can be added to PNE1's SG
Test Procedure	1. User chooses at PNE2 to join PNE1's Service Group; 2. PNE2 sends a SGActionRequest message with action attribute "2" (Join) to its PN GW; 3. PNE2's PN GW forwards the request to the CPNS Server; 4. CPNS Server accepts PNE2 and updates the SG Inventory; 5. CPNS Server sends a SGActionResponse message to PN GW managing PNE2 that will store the SG Inventory with PNE2 and that will forward the message to PNE2; 6. PNE2 stores the SG Inventory; 7. CPNS Server sends a SGChangeNotify messages to PN GW1 and PN GW2 (if used) of the SG updates; 8. PN GW1 and PN GW2 (if used) update their SG Inventories and relay the SGChangeNotify message to PNE1 and PNE2; 9. PNE1 and PNE2 update their SG Inventory.
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2 (if used), PNE1 and PNE2 have a correct version of the SG Inventory with the 4 entities;

Table 17: Test Information for CPNS-1.0-int-17 Interoperability Test

6.3.5 Service Group Leave

Test Case Id	CPNS-1.0-int-18
Test Object	PNE1, PNE2, PN GW1, PN GW2 (optional) and CPNS Server

Test Case Description	PNE2 leaves PNE1 owned Service Group
Specification Reference	[TS_Core] section 7.7.2.3, 7.7.2.4
SCR Reference	CPNS-SGM-C-006-M, CPNS-SGM-C-008-M, CPNS-SMETA-C-001-M, CPNS-SMETA-C-002-M, CPNS-SGM-C-015-M, CPNS-SGM-C-016-M, CPNS-SGM-C-017-M, CPNS-SGM-S-004-M, CPNS-SGM-S-005-M, CPNS-SGM-S-006-M, CPNS-SMETA-S-001-M
ETR Reference	SGM-005, SGM-006
Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are members of one PN. PNE2 can be of the same PN or with an optional PN GW2 be members of another PN. • State: o PNE1 owns an existent Service Group o PNE2 is part of PNE1 SG o PNE2 can leaves PNE1's SG
Test Procedure	1. User chooses at PNE2 to leave PNE1's Service Group; 2. PNE2 sends a SGActionRequest message with action attribute "3" (Leave) to its PN GW; 3. PNE2's PN GW forwards the request to the CPNS Server; 4. CPNS Server accepts PNE2 leave and updates the SG Inventory; 5. CPNS Server sends a SGActionResponse message to PN GW managing PNE2 that will remove PNE2 from its SG Inventory and that will forward the message to PNE2; 6. PNE2 removes PNE1's SG from its SG Inventory; 7. CPNS Server sends a SGChangeNotify messages to PN GW1 and PN GW2 (if used) of the SG updates; 8. PN GW1 and PN GW2 (if used) update their SG Inventories and relay the SGChangeNotify message to PNE1 and PNE2; 9. PNE1 and PNE2 update their SG Inventory.
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2 (if used), PNE1 have a correct version of the SG Inventory with the entities still belonging to the SG; 2. PNE2 do not have PNE1's SG on the SG Inventory

Table 18: Test Information for CPNS-1.0-int-18 Interoperability Test

6.3.6 Service Group Release

Test Case Id	CPNS-1.0-int-19
Test Object	PNE1, PNE2, PN GW1, PN GW2 (optional) and CPNS Server
Test Case Description	PNE1 owned Service Group is released
Specification Reference	[TS_Core] section 7.7.5

SCR Reference	CPNS-SGM-C-010-M, CPNS-SMETA-C-001-M, CPNS-SMETA-C-002-M, CPNS-SGM-C-019-M, CPNS-SGM-S-008-M, CPNS-SMETA-S-001-M
ETR Reference	--
Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are members of one PN. PNE2 can be of the same PN or with an optional PN GW2 be members of another PN. • State: o PNE1 owns an existent Service Group o PNE2 is part of PNE1 SG o PNE1 can release its SG
Test Procedure	1. User chooses at PNE1 to release the Service Group; 2. PNE1 sends a SGReleaseRequest message to its PN GW1; 3. PN GW1 forwards the SGReleaseRequest to the CPNS Server; 4. CPNS Server accepts the release request; 5. CPNS Server sends a SGReleaseNotification message to PN GW managing PNE2 that will deletes the corresponding SG Inventory and that will forward the message to PNE2; 6. PNE2 deletes the corresponding SG Inventory; 7. CPNS Server deletes the corresponding SG Inventory and sends a SGReleaseResponse to PN GW1; 8. PN GW1 deletes the corresponding SG Inventories and relay the SGReleaseResponse message to PNE1; 9. PNE1 deletes the corresponding SG Inventory.
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2 (if used) and PNE1 don't have the released SG on their SG Inventory;

Table 19: Test Information for CPNS-1.0-int-19 Interoperability Test

6.3.7 Service Group Transfer

Test Case Id	CPNS-1.0-int-20
Test Object	PNE1, PN GW1, PNE2, PN GW2 (optional) and CPNS Server
Test Case Description	Transfer of SG ownership
Specification Reference	[TS_Core] section 7.7.6
SCR Reference	CPNS-SGM-C-011-M, CPNS-SGM-C-020-M, CPNS-SGM-S-009-M
ETR Reference	SGM-007
Tool	None
Test code	None

Preconditions	• The PNE1, PN GW2, PNE2 and PN GW2 are members of a PN. • State: o PNE1 owns an existing Service Group o PNE2 is part of PNE1 SG o PNE1 can transfer the ownership
Test Procedure	1. User chooses at PNE1 to transfer SG owner to PNE2; 2. PNE1 sends a SGOwnerTransferRequest message to the PN GW1 with PNEID of PNE2; 3. PN GW1 forwards the request to the CPNS Server; 4. CPNS Server accepts and sends a SGOwnerTransferRequest to the PN GW managing PNE2 that will forward it to PNE2; 5. PNE2 accepts to be the SG Owner and updates its SG Inventory; 6. PNE 2 replies with a SGOwnerTransferResponse to its PN GW; 7. PNE2's PN GW updates its SG Inventory and forwards the SGOwnerTransferResponse to the CPNS Server; 8. CPNS Server updates its own SG Inventory; 9. CPNS Server sends a SGOwnerTransferResponse to PN GW 1; 10. PN GW 1 updates the SG Inventory and forwards the SGOwnerTransferResponse to PNE1; 11. PNE1 updates the SG Inventory ; 12. CPNS Server sends a SGChangeNotify messages to PN GW1 and PN GW2 (if used) of the SG updates; 13. PN GW1 and PN GW2 (if used) update their SG Inventories and relay the SGChangeNotify message to PNE1 and PNE2; 14. PNE1 and PNE2 update their SG Inventory.
Pass-Criteria	1. The CPNS server, the PN GW1, PN GW2 (if used), PNE1 have a correct version of the SG Inventory with PNE2 as the SG owner;

Table 20: Test Information for CPNS-1.0-int-20 Interoperability Test

6.3.8 Service Group Query

Test Case Id	CPNS-1.0-int-21
Test Object	PNE, PN GW and CPNS Server
Test Case Description	SG query
Specification Reference	[TS_Core] section 7.7.6
SCR Reference	CPNS-SGM-C-009-M, CPNS-SGM-C-018-M, CPNS-SGM-S-007-M
ETR Reference	SGM-008
Tool	None
Test code	None

Preconditions	• The PNE and PN GW are members of a PN. • State: o There are public Service Groups available at the CPNS Server to query.
Test Procedure	1. User initiates a query at PNE including members list; 2. PNE sends a SGDiscoveryRequest message with MemberReq set to "True" and with parameters matching an existing SG at the CPNS Server to the PN GW; 3. PN GW forwards the request to the CPNS Server; 4. CPNS Server creates a list of matching SG including the SGID and theirs members list and returns it to the PN GW on a SGDiscoveryResponse message; 5. PN GW forwards the SGDiscoveryResponse to the PNE;
Pass-Criteria	1. User can see the SG list with the corresponding members.

Table 21: Test Information for CPNS-1.0-int-21 Interoperability Test

6.4 Group Key Management

6.4.1 Group Key creation

6.4.1.1 Unicast based Group Key delivery

Test Case Id	CPNS-1.0-int-22
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key creation and Unicast based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-003-M, CPNS-GKM-C-004-M, CPNS-GKM-C-009-M, CPNS-GKM-S-001-M, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None
Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.

Test Procedure	1. User starts Service Group creation at PNE 1 with inviting PNE 2 in the Service Group; 2. The CPNS Server creates a Group Key and stores the Group Key. 3. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the created Group Key 4. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 5. The PN GW chooses Unicast Group Key delivery as a derivery method of Group Key. 6. The PN GW sends a GroupKeyDeliveryRequest message by unicast with the Group Key to PNE 1 and PNE 2, respectively. 7. The PNE 1 and PNE 2 store Group Key, respectively. 8. The PNE 1 and PNE 2 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server, PNE1 and PNE2 correctly store Group Key.

Table 22: Test Information for CPNS-1.0-int-22 Interoperability Test

6.4.1.2 Broadcast based Group Key delivery

Test Case Id	CPNS-1.0-int-23
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key Creation and Broadcast based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-004-M, CPNS-GKM-C-005-O, CPNS-GKM-C-006-O, CPNS-GKM-C-010-O, CPNS-GKM-C-011-O, CPNS-GKM-S-001-M , CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None
Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1, PNE 2 and PN GW support broadcast based Group Key delivery • GKDK is assigned to PNE 1 and PNE 2, respectively. • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.

Test Procedure	1. User starts Service Group creation at PNE 1 with inviting PNE 2 in the Service Group; 2. The CPNS Server creates a Group Key and stores the Group Key. 3. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the created Group Key 4. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 5. The PN GW chooses Broadcast Group Key delivery as a delivery method of Group Key. 6. The PN GW encrypts the Group Key using GKEK. 7. The PN GW sends a GroupKeyDeliveryRequest message by broadcast to PNE 1 and PNE 2 with the encrypted Group Key 8. The PNE 1 and PNE 2 decrypt the Group Key using pre-assigned GKDK and store the Group Key, respectively. 9. The PNE 1 and PNE 2 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server, PNE1 and PNE2 correctly store Group Key.

Table 23: Test Information for CPNS-1.0-int-23 Interoperability Test

6.4.1.3 Hybrid Group Key delivery

Test Case Id	CPNS-1.0-int-24
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key Creation and Hybrid Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-003-M, CPNS-GKM-C-004-M, CPNS-GKM-C-005-O, CPNS-GKM-C-006-O, CPNS-GKM-C-009-M, CPNS-GKM-C-010-O, CPNS-GKM-C-011-O, CPNS-GKM-S-001-M , CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None
Preconditions	• The PNE 1, PNE2 and PN GW are physically paired; • The PNE 1 and PN GW support broadcast based Group Key delivery • GKDK is assigned to PNE 1 • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.

Test Procedure	1. User starts Service Group creation at PNE 1 with inviting PNE 2 in the Service Group; 2. The CPNS Server creates a Group Key and stores the Group Key. 3. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the created Group Key 4. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 5. The PN GW chooses hybrid Group Key delivery as a delivery method of Group Key. 6. The PN GW encrypts Group Key using GKEK. 7. The PN GW sends a GroupKeyDeliveryRequest message by broadcast with the encrypted Group Key to PNE 1 8. The PN GW sends a GroupKeyDeliveryRequest message by unicast with the Group Key to PNE 2 9. The PNE 1 decrypte Group Key using pre-assigned GKDK and store Group Key. 10. The PNE 2 store Group Key. 11. The PNE 1 and PNE 2 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server, PNE1 and PNE2 correctly store Group Key.

Table 24: Test Information for CPNS-1.0-int-24 Interoperability Test

6.4.2 Group Key Update when member leaves

6.4.2.1 Unicast based Group Key delivery

Test Case Id	CPNS-1.0-int-25
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key Update when member leaves and Unicast based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-003-M, CPNS-GKM-C-004-M, CPNS-GKM-C-009-M, CPNS-GKM-S-002-M, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None

Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1 and PNE 2 belong to the same Service Group • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. User starts member leaving from the Service Group at PNE 1; 2. The CPNS Server updates a Group Key and stores the Group Key after receiving a SGActionRequest message withe Action =”3”. 3. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the updated Group Key 4. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 5. The PN GW chooses Unicast based Group Key delivery as a delivery method of Group Key. 6. The PN GW sends a GroupKeyDeliveryRequest message by unicast with the Group Key to PNE 2 7. The PNE 2 stores Group Key. 8. The PNE 2 sends a GroupKeyDeliveryResponse message to the PN GW.
Pass-Criteria	1. The CPNS Server and PNE2 correctly store the updated Group Key.

Table 25: Test Information for CPNS-1.0-int-25 Interoperability Test

6.4.2.2 Broadcast based Group Key delivery

Test Case Id	CPNS-1.0-int-26
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key Update when member leaves and Broadcast based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-004-M, CPNS-GKM-C-005-O, CPNS-GKM-C-006-O, CPNS-GKM-C-010-O, CPNS-GKM-C-011-O, CPNS-GKM-S-002-M, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None

Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1 and PNE 2 belong to the same Service Group • The PNE 2 and PN GW support broadcast based Group Key delivery • GKDK is assigned to PNE 2 • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. User starts member leaving from the Service Group at PNE 1; 2. The CPNS Server updates a Group Key and stores the Group Key after receiving a SGActionRequest message withe Action =”3”. 3. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the updated Group Key 4. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 5. The PN GW chooses Broadcast based Group Key delivery as a delivery method of Group Key. 6. The PN GW updates GKEK. 7. The PN GW encrypts the Group Key using GKEK. 8. The PN GW sends a GroupKeyDeliveryRequest message by broadcast to PNE 2 with the encrypted Group Key 9. The PNE 2 decrypts the Group Key using pre-assigned GKDK and store the Group Key. 10. The PNE 2 send a GroupKeyDeliveryResponse message to the PN GW.
Pass-Criteria	1. The CPNS Server and PNE2 correctly store the updated Group Key

Table 26: Test Information for CPNS-1.0-int-26 Interoperability Test

6.4.2.3 Hybrid Group Key delivery

Test Case Id	CPNS-1.0-int-27
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key Update when member leaves and Hybrid based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-003-M, CPNS-GKM-C-004-M, CPNS-GKM-C-005-O, CPNS-GKM-C-006-O, CPNS-GKM-C-009-O, CPNS-GKM-C-010-O, CPNS-GKM-C-011-O, CPNS-GKM-S-002-M, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None

Preconditions	• The PNE 1, PNE 2, PNE 3 and PN GW are physically paired; • The PNE 1, PNE 2 and PNE3 belong to the same Service Group • The PNE 2 and PN GW support broadcast based Group Key delivery • GKDK is assigned to PNE 2 • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. User starts member leaving from the Service Group at PNE 1; 2. The CPNS Server updates a Group Key and stores the Group Key after receiving a SGActionRequest message withe Action =”3”. 3. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the updated Group Key 4. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 5. The PN GW chooses hybrid Group Key delivery as a delivery method of Group Key. 6. The PN GW updates GKEK. 7. The PN GW encrypts the Group Key using GKEK. 8. The PN GW sends a GroupKeyDeliveryRequest message by broadcast to PNE 2 with the encrypted Group Key 9. The PN GW sends a GroupKeyDeliveryRequest message by unicast with the Group Key to PNE 3 10. The PNE 2 decrypte Group Key using pre-assigned GKDK and store Group Key. 11. The PNE 3 store Group Key. 12. The PNE 2 and PNE 3 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server, PNE2 and PNE 3 correctly store the updated Group Key

Table 27: Test Information for CPNS-1.0-int-27 Interoperability Test

6.4.3 Periodic Group Key Update

6.4.3.1 Unicast based Group Key delivery

Test Case Id	CPNS-1.0-int-28
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Periodic Group Key Update and Unicast based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1

SCR Reference	CPNS-GKM-C-003-M, CPNS-GKM-C-004-M, CPNS-GKM-C-009-M, CPNS-GKM-S-003-O, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None
Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1 and PNE 2 belong to the same Service Group • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. The CPNS Server updates a Group Key and stores the Group Key when a previous Group Key is expired. 2. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the updated Group Key 3. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 4. The PN GW chooses Unicast based Group Key delivery as a delivery method of Group Key. 5. The PN GW sends a GroupKeyDeliveryRequest message by unicast with the Group Key to PNE 1 and PNE 2, respectively. 6. The PNE 1 and PNE 2 store Group Key, respectively. 7. The PNE 1 and PNE 2 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server PNE 1 and PNE2 correctly store the updated Group Key.

Table 28: Test Information for CPNS-1.0-int-28 Interoperability Test

6.4.3.2 Broadcast based Group Key delivery

Test Case Id	CPNS-1.0-int-29
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Periodic Group Key Update and Broadcast based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-004-M, CPNS-GKM-C-005-O, CPNS-GKM-C-006-O, CPNS-GKM-C-010-O, CPNS-GKM-C-011-O, CPNS-GKM-S-003-O, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None

Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1 and PNE 2 belong to the same Service Group • The PNE 1 and PNE 2 and PN GW support broadcast based Group Key delivery • GKDK is assigned to PNE 1 and PNE 2, respectively. • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. The CPNS Server updates a Group Key and stores the Group Key when a previous Group Key is expired. 2. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the updated Group Key 3. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 4. The PN GW chooses Broadcast based Group Key delivery as a delivery method of Group Key. 5. The PN GW encrypts the Group Key using GKEK. 6. The PN GW sends a GroupKeyDeliveryRequest message by broadcast to PNE 1 and PNE 2 with the encrypted Group Key 7. The PNE 1 and PNE 2 decrypt the Group Key using pre-assigned GKDK and store the Group Key, respectively. 8. The PNE 1 and PNE 2 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server, PNE 1 and PNE 2 correctly store the updated Group Key

Table 29: Test Information for CPNS-1.0-int-29 Interoperability Test

6.4.3.3 Hybrid Group Key delivery

Test Case Id	CPNS-1.0-int-30
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key Update according to member leaving and Hybrid based Group Key delivery
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-003-M, CPNS-GKM-C-004-M, CPNS-GKM-C-005-O, CPNS-GKM-C-006-O, CPNS-GKM-C-009-O, CPNS-GKM-C-010-O, CPNS-GKM-C-011-O, CPNS-GKM-S-003-O, CPNS-GKM-S-005-M,
ETR Reference	GKM-001
Tool	None
Test code	None

Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1 and PNE 2 belong to the same Service Group • The PNE 1 and PN GW support broadcast based Group Key delivery • GKDK is assigned to PNE 1 • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. The CPNS Server updates a Group Key and stores the Group Key when a previous Group Key is expired. 2. The CPNS Server sends a GroupKeyDeliverRequest message to PN GW with the updated Group Key 3. The PN GW sends a GroupKeyDeliveryResponse message to CPNS Server 4. The PN GW chooses hybrid Group Key delivery as a delivery method of Group Key. 5. The PN GW encrypts Group Key using GKEK. 6. The PN GW sends a GroupKeyDeliveryRequest message by broadcast with the encrypted Group Key to PNE 1 7. The PN GW sends a GroupKeyDeliveryRequest message by unicast with the Group Key to PNE 2 8. The PNE 1 decrypte Group Key using pre-assigned GKDK and store Group Key. 9. The PNE 2 stores Group Key. 10. The PNE 1 and PNE 2 send a GroupKeyDeliveryResponse message to the PN GW, respectively.
Pass-Criteria	1. The CPNS Server, PNE 1 and PNE 2 correctly store the updated Group Key

Table 30: Test Information for CPNS-1.0-int-30 Interoperability Test

6.4.4 Group Key deletion

Test Case Id	CPNS-1.0-int-31
Test Object	PNE 1, PNE 2, PN GW and CPNS Server
Test Case Description	Group Key deletion
Specification Reference	[TS_Core] section 6.6.1.1
SCR Reference	CPNS-GKM-C-001-M, CPNS-GKM-S-004-M,
ETR Reference	GKM-001
Tool	None
Test code	None

Preconditions	• The PNE 1, PNE 2 and PN GW are physically paired; • The PNE 1 and PNE 2 belong to the same Service Group • The PNE 1 is a SG Owner • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.
Test Procedure	1. User starts Service Group release at PNE 1; 2. The CPNS Server deletes Group Key after a receiving SGReleaseRequest message. 3. The PN GW deletes GKEK after receving a SGReleaseNotification message. 4. The PNE 1 and PNE 2 delete Group Key after receving a SGReleaseNotification message.
Pass-Criteria	1. The CPNS Server, PNE1 and PNE2 correctly delete Group Key.

Table 31: Test Information for CPNS-1.0-int-31 Interoperability Test

6.4.5 GKDK assignment

Test Case Id	CPNS-1.0-int-32
Test Object	PNE and PN GW
Test Case Description	GKDK assignment
Specification Reference	[TS_Core] section 7.8.4
SCR Reference	CPNS-GKM-C-002-O, CPNS-GKM-C-007-O
ETR Reference	GKM-001
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • The PNE and PN GW support broadcast based Group Key delivery • State: o User is already registered o The Entity Discovery was already done o EUKey has been assigned to all the entities.

Test Procedure	1. User starts the Service Group creation at PNE; 2. PNE sends a GKDKRequest message to the PN GW with PNE ID 3. PN GW creates a GKDK for the PNE and store PNE ID 4. PN GW sends a GKDKResponse message with the created GKDK to PNE 5. PNE stores the GKDK
Pass-Criteria	1. The PN GW stores correctly PNE ID 2. The PNE stores correctly a GKDK

Table 32: Test Information for CPNS-1.0-int-32 Interoperability Test

6.5 Service Discovery

6.5.1 Reactive – External Content Provider

Test Case Id	CPNS-1.0-int-33
Test Object	PNE, PN GW and CPNS Server
Test Case Description	reactive Service Discovery retrieving ServiceProfile of external content provider
Specification Reference	[TS_Core] section 5.10.2, and section 7.9.2
SCR Reference	CPNS-SPD-C-001-M, CPNS-SPD-C-005-M, CPNS-SPD-S-001-M
ETR Reference	SPD-002
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed; o PN Establishment & Registration has been performed; o CPNS Profile of the external content provider is already stored in the CPNS Server

Test Procedure	1. User starts the Service Discovery at PNE; 2. The PNE sends a ServiceDiscoveryRequest to the PN GW with a CPID as searching condition; 3. The PN GW relays the ServiceDiscoveryRequest to the CPNS Server; 4. The CPNS Server accepts the ServiceDiscoveryRequest and finds relevant CPNS Profile based on CPID; 5. The CPNS Server composes searched result referencing relevant CPNS Profile and sends ServiceDiscoveryResponse with the TargetInfo(s) containing ServiceProfile to the PN GW. 6. The PN GW relays the ServiceDiscoveryResponse to the PNE. 7. PNE accepts the ServiceDiscoveryResponse.
Pass-Criteria	1. The PNE successfully retrieves metadata of discovered service which are relevant to searching condition, CPID.

Table 33: Test Information for CPNS-1.0-int-33 Interoperability Test

6.5.2 Reactive – Remote PNE as content provider

Test Case Id	CPNS-1.0-int-34
Test Object	PNE, PN GW and CPNS Server
Test Case Description	reactive Service Discovery retrieving ServiceProfile, in the case where a Remote PNE acts as a content provider
Specification Reference	[TS_Core] section 6.7.2, Appendix E, section 5.10.2, and section 7.9.2
SCR Reference	CPNS-SPD-C-001-M, CPNS-SPD-C-005-M, CPNS-SPD-S-001-M
ETR Reference	SPD-002
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed; o PN Establishment & Registration has been performed; o PN information (including ServiceProfile of the Remote PNE) of the PN that Remote PNE resides in is stored in CPNS Server; o The value of Disclosure attributes of the PN is set to ‘2’ (i.e., open).

Test Procedure	1. User starts the Service Discovery at PNE; 2. The PNE sends a ServiceDiscoveryRequest to the PN GW with a UserID and a Keyword (arbitrary text as searching condition); 3. The PN GW relays the ServiceDiscoveryRequest to the CPNS Server; 4. The CPNS Server accepts the ServiceDiscoveryRequest and finds relevant PNInfo based on UserID and Keyword; 5. The CPNS Server confirms that the value of Disclosure attribute of relevant PNInfo(s) is set to '2'; 6. The CPNS Server composes searched result referencing relevant PN information and sends ServiceDiscoveryResponse with the TargetInfo(s) containing ServiceProfile to the PN GW. 7. The PN GW relays the ServiceDiscoveryResponse to the PNE. 8. PNE accepts the ServiceDiscoveryResponse.
Pass-Criteria	1. The PNE successfully retrieves metadata of discovered service which are relevant to searching condition, UserID and Keyword.

Table 34: Test Information for CPNS-1.0-int-34 Interoperability Test

6.5.3 Reactive method with access control

Test Case Id	CPNS-1.0-int-35
Test Object	PNE1, PN GW1, PN GW2 (optional) and CPNS Server
Test Case Description	Service discovery by PNE – reactive method with access control
Specification Reference	[TS_Core] sections 7.9.2, 6.7.2
SCR Reference	CPNS-SPD-C-001-M, CPNS-CMETA-C-001-M, CPNS-SPD-C-005-M, CPNS-SPD-S-001-M, CPNS-CMETA-S-001-M
ETR Reference	SPD-002, SPD-003
Tool	None
Test code	None
Preconditions	• PNE1 and PN GW1 are one PN and PNE2 is member of that PN or is on another PN with PN GW2 is used. • The PN is configured to require confirmation for the Service Discovery • CPNS server has public Service Profiles that matches the query made by PNE1 and the service is published by PNE2 • State: o PN is established o The value of the Discloser attribute of the PN is set to "3" o OwnershipEntityID of the PN that PNE2 belong to is PNE2

Test Procedure	1. User requests at the PNE1 to discover Services with search condition matching service from PNE2; 2. PNE1 sends ServiceDiscoveryRequest message to PN GW1; 3. PN GW1 forwards the ServiceDiscoveryRequest message to the CPNS Server; 4. CPNS Server confirms the search condition is satisfied and Discloser is set to "3" and sends the ServiceDiscoveryConfirmationRequest to PN GW of PNE2; 5. PNE2's PN GW forward the ServiceDiscoveryConfirmationRequest to PNE2; 6. PNE2 replies with ServiceDiscoveryConfirmationResponse to its PN GW; 7. PNE2' PN GW forwards the ServiceDiscoveryConfirmationResponse to the CPNS Server; 8. CPNS sends ServiceDiscoveryResponse to PN GW1; 9. PN GW1 ServiceDiscoveryResponse forward to PNE.
Pass-Criteria	1. PNE1 becomes aware of the service published by PNE2.

Table 35: Test Information for CPNS-1.0-int-35 Interoperability Test

6.5.4 Proactive – External Content Provider

Test Case Id	CPNS-1.0-int-36
Test Object	PNE, PN GW and CPNS Server
Test Case Description	proactive Service Discovery advertising CPInfo and ServiceProfile, in the case where an external entity acts as a content provider.
Specification Reference	[TS_Core] section 6.7.3, section 5.10.2, and section 7.9.3
SCR Reference	CPNS-SPD-C-002-M, CPNS-SPD-C-006-M, CPNS-SPD-S-002-M
ETR Reference	SPD-003
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • The destination (PNE) of the message is known to the CPNS Server already. • State: o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed; o PN Establishment & Registration has been performed; o Service Description is published by external CP to CPNS Server; o The Service Description is stored in CPNS Server in the form of CPNS Profile

Test Procedure	1. The CPNS Server assembles ServiceDescriptionAdvertise with CPInfo and ServiceProfile derived from CPNS Profile and sends ServiceDescriptionAdvertise to the PN GW; 2. The PN GW relays the ServiceDescriptionAdvertise to the PNE; 3. The PNE accepts the ServiceDescriptionAdvertise
Pass-Criteria	1. The PNE successfully accepts the metadata of content provider in the form of CPInfo and Service Description in the form of ServiceProfile, which are advertised by the CPNS Server on behalf of external CP.

Table 36: Test Information for CPNS-1.0-int-36 Interoperability Test

6.6 Service Publication

6.6.1 From PNE (PN Establishment originating PNE)

Test Case Id	CPNS-1.0-int-37
Test Object	PNE, PN GW and CPNS Server
Test Case Description	originating PNE Service Publication via PN Establishment (ServiceProfile included in PNSetupRequest)
Specification Reference	[TS_Core] section 6.6.1.1, section 5.8, section 5.10.2, section 7.6.1, and section 7.9.4
SCR Reference	CPNS-PNM-C-001-M, CPNS-PNM-C-011-M, CPNS-PNM-S-001-M
ETR Reference	SPD-001
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed;

Test Procedure	1. The PNE sends PNSetupRequest with its ServiceProfile to the PN GW; 2. The PN GW relays PNSetupRequest to the CPNS Server; (for the testing purpose skip the Authtientication procedure) 3. The CPNS Server accepts the PNSetupRequest and store PN information (including ServiceProfile) in the form of PNInfo which is derived from PNSetupReuqest; 4. The CPNS Server sends the PNSetupResponse to the PN GW; 5. The PN GW accepts the PNSetupResponse and store the PN Information in local PN Inventory under PNInfo element; 6. The PN GW sends the PNSetupResponse to the PNE; 7. The PNE accepts PNSetupResponse
Pass-Criteria	1. The PN GW and CPNS Server correctly store the PN information including ServiceProfile in the form of PNInfo

Table 37: Test Information for CPNS-1.0-int-37 Interoperability Test

6.6.2 From PNE (PN Establishment invited PNE)

Test Case Id	CPNS-1.0-int-38
Test Object	PNE, PN GW and CPNS Server
Test Case Description	invited PNE Service Publication (ServiceProfile included in PNSetupResponse) via PN Establishment
Specification Reference	[TS_Core] section 6.6.1.2, section 5.8, section 5.10.2, section 7.6.1, and section 7.9.4
SCR Reference	CPNS-PNM-C-002-M, CPNS-PNM-C-012-M, CPNS-PNM-S-001-M
ETR Reference	SPD-001
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed;
Test Procedure	1. The PN GW sends PNSetupRequest to PNE; 2. The PNE accespts the PNSetupRequest and sends PNSetupResponse with its ServiceProfile to the PN GW; *3. (The rest is the same procedure as captured in Section 6.1.1 from step 2 to 7)*

Pass-Criteria	1. The PN GW and CPNS Server correctly store the PN information including ServiceProfile in the form of PNInfo

Table 38: Test Information for CPNS-1.0-int-38 Interoperability Test

6.6.3 From PNE via standalone Service Publication

Test Case Id	CPNS-1.0-int-39
Test Object	PNE, PN GW and CPNS Server
Test Case Description	standalone Service Publication initiated by PNE
Specification Reference	[TS_Core] section 6.7.1, section 5.10.2, and section 7.9.4
SCR Reference	CPNS-SPD-C-004-M , CPNS-SPD-C-008-M, CPNS-SPD-S-004-M
ETR Reference	SPD-001
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • State: o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed; o PN Establishment & Registration has been performed;
Test Procedure	1. User starts the Service Publication at PNE; 2. The PNE sends ServiceDescriptionRegistrationRequest with its ServiceProfile to PN GW; 3. The PN GW relays the ServiceDescriptionRegistrationRequest to CPNS Server; 4. The CPNS Server accepts the ServiceDescriptionRegistrationRequest and replaces the already stored ServiceProfile in PNInfo (which is published via PN Establishment procedure) with the ServiceProfile contained in ServiceDescriptionRegistrationRequest using the PNEID as a key for replacement; 5. The CPNS Server sends ServiceDescriptionRegistrationResponse to the PN GW; 6. The PN GW relays ServiceDescriptionRegistrationResponse to the PNE; 7. The PN GW accepts the ServiceDescriptionRegistrationResponse
Pass-Criteria	1. The CPNS Server correctly replaces the ServiceProfile, which is stored in the form of PN Inventory

Table 39: Test Information for CPNS-1.0-int-39 Interoperability Test

6.6.4 From external content provider – creating Service Description

Test Case Id	CPNS-1.0-int-40
Test Object	CPNS Server *and external content provider*
Test Case Description	Initial standalone Service Publication initiated by external content provider
Specification Reference	[TS_Core] section 6.7.1, section 5.10.2, and section 7.9.4
SCR Reference	CPNS-SPD-S-005-M
ETR Reference	SPD-001
Tool	None
Test code	None
Preconditions	• The address of CPNS Server is known to external CP • State: o No Service Description for this CP indentified by CPID is stored in CPNS Server
Test Procedure	1. The external CP sends ServiceDescriptionRegistrationRequest to the CPNS Server. 2. The CPNS Server accepts the ServiceDescriptionRegistrationRequest and confirms that there is NO existing Service Description from this CP using CPID as a key and stores the ServiceProfile in the form of CPNS Profile; 3. The CPNS Server sends ServiceDescriptionRegistrationResponse to the CP
Pass-Criteria	1. The CPNS Server correctly stores the ServiceProfile in the form of CPNS Profile

Table 40: Test Information for CPNS-1.0-int-40 Interoperability Test

6.6.5 From external content provider – replacing Service Description

Test Case Id	CPNS-1.0-int-41
Test Object	CPNS Server *and external content provider*
Test Case Description	standalone Service Publication initiated by external content provider
Specification Reference	[TS_Core] section 6.7.1, section 5.10.2, and section 7.9.4
SCR Reference	CPNS-SPD-S-005-M
ETR Reference	SPD-001
Tool	None
Test code	None

Preconditions	• The address of CPNS Server is known to external CP • State: o Initial Service Publication from this external CP has been performed; o Service Description for this CP, identified by CPID is already stored in CPNS Server o Service Description being published is different from the already stored Service Description
Test Procedure	1. The external CP sends ServiceDescriptionRegistrationRequest to the CPNS Server. 2. The CPNS Server accepts the ServiceDescriptionRegistrationRequest and confirms that there is existing Service Description from this CP using CPID as a key and replaces the ServiceProfile; 3. The CPNS Server sends ServiceDescriptionRegistrationResponse to the CP
Pass-Criteria	1. The CPNS Server correctly replaces the ServiceProfile, which is stored in the form of CPNS Profile

Table 41: Test Information for CPNS-1.0-int-41 Interoperability Test

6.7 Service Delivery

6.7.1 External content provider

Test Case Id	CPNS-1.0-int-42
Test Object	PNE, PN GW, and CPNS Server
Test Case Description	Service Control of external content provider providing service
Specification Reference	[TS_Core] section 6.10.2, section 7.10
SCR Reference	CPNS-SCD-C-001-M, CPNS-SCD-C-002-M, CPNS-SCD-S-001-M
ETR Reference	SCD-005
Tool	None
Test code	None

Preconditions	• The PNE and PN GW are physically paired; • State : o User of PNE is already registered; o PN GW Authentication has been performed; o CPNS Entity Discovery has been performed; o PN Establishment & Registration has been performed; o Service Description of external content provider is already stored in CPNS Server; o Service Discovery has been performed and metadata of the service and list of content information is known to the PNE
Test Procedure	1. The User selects specific content provided by the service; *Note: In this test case example, the user using PNE consumes the content streaming service from external content provider.* 2. The PNE sends InvokeRequest to PN GW with DestID identifying the final destination of the message i.e., CPID, ServiceID indicating the service e.g., 'bbc.co.uk/sport/snooker_1' and the Operation attribute indicating execution command e.g., 'PLAY', in which ServiceID and supported Operation by the service is known through Service Discovery; 3. The PN GW relays the InvokeRequest to the CPNS Server; 4. The CPNS Server confirms that the request is to invoke the service of external content provider and relays the InvokeRequest to the external content provider identified by received CPID; 5. The CPNS Server receives InvokeResponse from the external content provider and relays the message to the PN GW; 6. The PN GW relays the InvokeResponse to the PNE; 7. The PNE accepts the Invokeresponse
Pass-Criteria	1. The PNE successfully accepts the InvokeResponse with Result element equals to 'TRUE' *Note: Above pass-criteria means in application level, the PNE successfully receives streaming data from the external content provider.*

Table 42: Test Information for CPNS-1.0-int-42 Interoperability Test

6.7.2 PNE as a content provider

Test Case Id	CPNS-1.0-int-43
Test Object	PNE1, PN GW1, PNE2, PN GW2 and CPNS Server
Test Case Description	Service control of PNE2 providing service
Specification Reference	[TS_Core] section 6.10.3, Appendix E, section 7.10
SCR Reference	CPNS-SCD-C-001-M, CPNS-SCD-C-002-M, CPNS-SCD-S-001-M
ETR Reference	SCD-005

Tool	None
Test code	None
Preconditions	• The PNE1 and PN GW1 are physically paired; • The PNE2 and PN GW2 are physically paired and located in remote area from PNE1 and PN GW1; • PNE1 is the service/content consumer; • PNE2 is the content provider • State : o User of PNE1 and PNE2 is already registered; o PN GW1 and PNGW2 Authentication has been performed; o CPNS Entity Discovery has been performed for PNE1 and PN GW1; o CPNS Entity Discovery has been performed for PNE2 and PN GW2; o PN Establishment & Registration has been performed for PNE1 and PN GW1 and builds PN1; o PN Establishment & Registration has been performed for PNE2 and PN GW2 and builds PN2; o Service Description of PNE2 is stored in CPNS Server; o Service Discovery has been performed and metadata of the service (hosted by PNE2) is known to the PNE1
Test Procedure	1. The User selects specific service from the list of services *Note: In this test case example, the user using PNE1 remotely switches the lighting application hosted by PNE2 ON in dim mode.* 2. The PNE1 sends InvokeRequest to PN GW1 with DestID identifying the final destination of the message i.e., PNEID of PNE2, ServiceID indicating the service e.g., 'Light' and the Operation attribute indicating execution command e.g., 'ON' and InputParameterList containing the argument to the service invocation e.g., 'dim', in which all schema are derived from the metadata of the target service discovered via Service Discovery; 3. The PN GW1 relays the InvokeRequest to the CPNS Server; 4. The CPNS Server query the PNInfo of PNE2 and identify the responsible PN GW for the PNE2 and sends InvokeRequest to PN GW2; 5. The PN GW2 relays the InvokeRequest to the PNE2; 6. The PNE2 accepts the InvokeRequest and perform the service as it is requested, e.g., switching the light on; 7. The PNE2 sends the InvokeResponse with Result set to TRUE to the PN GW2; 8. The PN GW2 relays the InvokeResponse to the CPNS Server; 9. The CPNS Server relays the InvokeResponse to the PN GW1; 10. The PN GW1 relays the InvokeResponse to the PNE1; 11. The PNE1 accepts the Invokeresponse

Pass-Criteria	1. The PNE2 successfully accepts the InvokeRequest and in the response, the PNE1 successfully accepts the InvokeResponse with Result element equals to 'TRUE' *Note: Above pass-criteria means in application level, the PNE2 internally invokes e.g., switching module of lighting application and successfully switch the light on in dim mode.*

Table 43: Test Information for CPNS-1.0-int-43 Interoperability Test

6.8 Device Capabilities

6.8.1 Device Capabilities Query

6.8.1.1 PNE queried

Test Case Id	CPNS-1.0-int-44
Test Object	PNE, PN GW and CPNS Server
Test Case Description	Device Capability Query
Specification Reference	[TS_Core] section 7.12.1
SCR Reference	CPNS-DC-C-001-M, CPNS-DC-C-002-M, CPNS-DC-S-001-M
ETR Reference	DC-001
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • The PNE and PN GW are in the same PN • State: o User is already registered
Test Procedure	1. CPNS Server sends Device capabilities Query Request to PN GW to request the Device capabilities of PNE 2. PN GW forwards Device capabilities Query Request to PNE 3. PNE sends Device capabilities Query Response to PN GW with its device capabilities 4. PN GW forwards Device capabilities Query Response to CPNS Server
Pass-Criteria	1. CPNS Server receives the device capabilities of PNE

Table 44: Test Information for CPNS-1.0-int-44 Interoperability Test

6.8.1.2 PN GW queried

Test Case Id	CPNS-1.0-int-45
Test Object	PN GW and CPNS Server

Test Case Description	Device Capability Query
Specification Reference	[TS_Core] section 7.12.1
SCR Reference	CPNS-DC-C-001-M, CPNS-DC-C-002-M, CPNS-DC-S-001-M
ETR Reference	DC-001
Tool	None
Test code	None
Preconditions	• PN GW and CPNS Server are communicating • State: o User is already registered
Test Procedure	1. CPNS Server sends Device capabilities Query Request to PN GW 2. PN GW sends Device capabilities Query Response to CPNS Server with its device capabilities
Pass-Criteria	1. CPNS Server receives the device capabilities of PN GW

Table 45: Test Information for CPNS-1.0-int-45 Interoperability Test

6.8.2 Device Capabilities Change Notification

6.8.2.1 PNE initiated

Test Case Id	CPNS-1.0-int-46
Test Object	PNE, PN GW and CPNS Server
Test Case Description	Device Capability Change Notification
Specification Reference	[TS_Core] section 7.12.1
SCR Reference	CPNS-DC-C-001-M, CPNS-DC-C-002-M, CPNS-DC-S-001-M
ETR Reference	DC-001
Tool	None
Test code	None
Preconditions	• The PNE and PN GW are physically paired; • The PNE and PN GW are in the same PN • The device capabilities of PNE are changed • State: o User is already registered
Test Procedure	1. PNE sends Device Capabilities Change Notification message to PN GW with its updated device capabilities 2. PN GW forwards Device Capabilities Change Notification message to CPNS Server

Pass-Criteria	1. CPNS Server receives the updated device capabilities of PNE

Table 46: Test Information for CPNS-1.0-int-46 Interoperability Test

6.8.2.2 PN GW initiated

Test Case Id	CPNS-1.0-int-47
Test Object	PN GW and CPNS Server
Test Case Description	Device Capability Change Notification
Specification Reference	[TS_Core] section 7.12.1
SCR Reference	CPNS-DC-C-001-M, CPNS-DC-C-002-M, CPNS-DC-S-001-M
ETR Reference	DC-001
Tool	None
Test code	None
Preconditions	• PN GW and CPNS Server are communicating • The device capabilities of PN GW are changed • State: o User is already registered
Test Procedure	1. PN GW sends Device Capabilities Change Notification to CPNS Server with its updated device capabilities
Pass-Criteria	1. CPNS Server receives the updated device capabilities of PN GW

Table 47: Test Information for CPNS-1.0-int-47 Interoperability Test

6.9 Usage Statistics Collection and Reporting

6.9.1 Initiated by Application on the PNE side

Test Case Id	CPNS-1.0-int-48
Test Object	PNE, PN GW and CPNS Server
Test Case Description	Usage Statistics collection and reporting
Specification Reference	[TS_Core] section 6.14.1
SCR Reference	CPNS-US-C-001-M, CPNS-US-C-002-M, CPNS-US-S-001-M
ETR Reference	US-001, US-002
Tool	None
Test code	None

Preconditions	• The communication between PNE and application on the PNE side is established • The PNE and PN GW are physically paired; • State: o User is already registered o The Entity Discovery was already made • Content is delivered to PNE and received by PNE
Test Procedure	1. Usage Statistics is collected by Application on PNE side, i.e. any user behavior e.g. opening of the content, rendering it, deleting, do nothing, delete without opening etc 2. Application on the PNE side sends the usage statistics information to PNE 3. PNE records the usage statistics information received from the application to be reused again if required 4. PNE forwards the usage statistics information to PN GW 5. PN GW records the usage statistics information received from PNE to be reused again if required 6. PN GW forwards the usage statistics information to CPNS Server 7. CPNS Server records the usage statistics information received from the PN GW 8. CPNS Server aggregates the usage statistics information in a report document together with statistics collected from other sources
Pass-Criteria	1. CPNS server, PN GW and PNE store correctly the usage statistics information to be used when required.

Table 48: Test Information for CPNS-1.0-int-48 Interoperability Test

6.9.2 Initiated by application on the Server side

Test Case Id	CPNS-1.0-int-49
Test Object	CPNS Server
Test Case Description	Usage statistics collection and reporting
Specification Reference	[TS_Core] section 6.14.2
SCR Reference	CPNS-US-S-001-M
ETR Reference	US-001, US-002
Tool	None
Test code	None

Preconditions	• The communication between CPNS Server and application on the Server side is established • State: o User is already registered o The Entity Discovery was already made • Content is delivered to the Server from different external entities • Usage Statistics is collected by Application on CPNS Server side
Test Procedure	1. Content is sent to CPNS Server and received by CPNS Server 2. Application on Server side collects usage statistics 3. Application on the Server side sends the usage statistics information to CPNS Server 4. CPNS Server records the usage statistics information received from the application to be reused again if required 5. CPNS Server aggregates the usage statistics information in a report document together with statistics collected from other sources
Pass-Criteria	1. CPNS server stores correctly the usage statistics information to be used when required

Table 49: Test Information for CPNS-1.0-int-49 Interoperability Test

6.10 Status Management

6.10.1 Status Subscription

6.10.1.1 Status Subscription – Subscribe

Test Case Id	CPNS-1.0-int-50
Test Object	PNE1, PNE2, PN GW and CPNS Server
Test Case Description	Status Subscription – Subscribe
Specification Reference	[TS_Core] sections 7.13.3, 6.13.3
SCR Reference	CPNS-CMETA-C-001-M, CPNS-SM-C-002-M, CPNS-SM-C-006-M, CPNS-SM-C-001-M,CPNS-CMETA-S-001-M, CPNS-SM-S-002-M
ETR Reference	SM-002
Tool	None
Test code	None
Preconditions	• PNE1 and PNE2 have the Sharing attribute to “1” in the PNInfo of its PN Inventory. • State: o PN is established having PNE1, PNE2 and PN GW as members;

Test Procedure	1. Tester requests at PNE2 to subscribe to notifications of status change in PNE1; 2. PNE2 sends a StatusSubscribeRequest to PN GW with PNE1 as TargetID; 3. PN GW relays the StatusSubscribeRequest message to the CPNS server; 4. CPNS server updates its list of status subscriptions of notifications; 5. CPNS Server replies to PN GW with a StatusSubscribeResponse to PN GW; 6. PN GW relays the StatusSubscribeResponse to PNE2;
Pass-Criteria	1. At the CPNS server it can be seen a list of subscribed notifications of status changes where it is visible that PNE2 has subscribe to be notified if PNE1 changes status.

Table 50: Test Information for CPNS-1.0-int-50 Interoperability Test

6.10.1.2 Status Subscription – Unsubscribe

Test Case Id	CPNS-1.0-int-51
Test Object	PNE1, PNE2, PN GW and CPNS Server
Test Case Description	Status Subscription – Unsubscribe
Specification Reference	[TS_Core] sections 7.13.3, 6.13.3
SCR Reference	CPNS-CMETA-C-001-M, CPNS-SM-C-002-M, CPNS-SM-C-006-M, CPNS-SM-C-001-M,CPNS-CMETA-S-001-M, CPNS-SM-S-002-M
ETR Reference	SM-002
Tool	None
Test code	None
Preconditions	• PNE1 and PNE2 have the Sharing attribute to “1” in the PNInfo of its PN Inventory. • State: o PN is established having PNE1, PNE2 and PN GW as members; o PNE2 has subscribed to be notified on PNE1 status changes (can be end point of previous test case)

Test Procedure	1. Tester requests at PNE2 to unsubscribe to notifications of status change in PNE1; 2. PNE2 sends a StatusSubscribeRequest to PN GW with PNE1 as TargetID and subscription duration time equal to 0; 3. PN GW relays the StatusSubscribeRequest message to the CPNS server; 4. CPNS server updates its list of status subscriptions of notifications ; 5. CPNS Server replies to PN GW with a StatusSubscribeResponse to PN GW; 6. PN GW relays the StatusSubscribeResponse to PNE2;
Pass-Criteria	1. At the CPNS server it can be seen a list of subscribed notifications for the status change where it is no longer visible that PNE2 has subscribed to be notified if PNE1 changes status or the subscription has expired.

Table 51: Test Information for CPNS-1.0-int-51 Interoperability Test

6.10.2 Status Publication and Notification

6.10.2.1 Status Publication and Notification - Inactive

Test Case Id	CPNS-1.0-int-52
Test Object	PNE1, PNE2, PN GW and CPNS Server
Test Case Description	Status publication and Notification - Inactive
Specification Reference	[TS_Core] sections 7.13.2, 7.13.4, 6.13.2, 6.13.3
SCR Reference	CPNS-CMETA-C-001-M, CPNS-SM-C-001-M, CPNS-SM-C-002-M, CPNS-SM-C-003-M, CPNS-SM-C-005-M, CPNS-SM-C-006-M, CPNS-SM-C-007-M, CPNS-SM-C-001-M,CPNS-CMETA-S-001-M, CPNS-SM-S-001-M, CPNS-SM-S-002-M, CPNS-SM-S-003-M
ETR Reference	SM-001, SM-004
Tool	None
Test code	None
Preconditions	• PNE1 and PNE2 have the Sharing attribute to “1” in the PNInfo of its PN Inventory. • State: o PN is established having PNE1, PNE2 and PN GW as members; o PNE1 and PNE2 are in Active Status; o PNE2 has subscribed to be notified of status changes in PNE1 (can be end point of TC Status Subscription – Subscribe)

Test Procedure	1. Tester disconnect PNE1 from the PN; 2. PNE1 updates the Active attribute of itself to “False” at its PN Inventory; 3. PN GW sends a StatusPublicationRequest message to the CPNS server with the new status of PNE1; 4. CPNS server updates the Active attribute of PNE1 to “False” at its PN Inventory; 5. CPNS Server replies to PN GW with a StatusPublicationResponse to PN GW; 6. PN GW updates the Active attribute of PNE1 to “False” on its PN Inventory; 7. PN GW sends a StatusNotify message to PNE2; 8. PNE2 updates the Active attribute of PNE1 to “False” at its PN Inventory.
Pass-Criteria	1. The Active attribute of PNE1 in its PNInfo in the PN Inventory of PNE1, PNE2, PN GW and CPNS server is equal to “False”.

Table 52: Test Information for CPNS-1.0-int-52 Interoperability Test

6.10.2.2 Status Publication and Notification - Active

Test Case Id	CPNS-1.0-int-53
Test Object	PNE1, PNE2, PN GW and CPNS Server
Test Case Description	Status publication and Notification - Inactive
Specification Reference	[TS_Core] sections 7.13.2, 7.13.4, 6.13.2
SCR Reference	CPNS-CMETA-C-001-M, CPNS-SM-C-001-M, CPNS-SM-C-002-M, CPNS-SM-C-004-M, CPNS-SM-C-005-M, CPNS-SM-C-006-M, CPNS-SM-C-008-M, CPNS-SM-C-001-M,CPNS-CMETA-S-001-M, CPNS-SM-S-001-M, CPNS-SM-S-002-M, CPNS-SM-S-004-M
ETR Reference	SM-001, SM-004
Tool	None
Test code	None
Preconditions	• PNE1 and PNE2 have the Sharing attribute to “1” in the PNInfo of its PN Inventory. • State: o PN is established having PNE1, PNE2 and PN GW as members; o PNE1 is in Inactive Status (can be the end point of previous test case); o PNE2 is in Active Status; o PNE2 has subscribed to be notified of status changes in PNE1 (can be end point of TC Status Subscription – Subscribe)

Test Procedure	1. Tester re-connects PNE1 to the PN; 2. PNE1 updates the Active attribute of itself to “True” at its PN Inventory; 3. PN GW sends a StatusPublicationRequest message to the CPNS server with the new status of PNE1; 4. CPNS server updates the Active attribute of PNE1 to “True” at its PN Inventory; 5. CPNS Server replies to PN GW with a StatusPublicationResponse to PN GW; 6. PN GW updates the Active attribute of PNE1 to “True” on its PN Inventory; 7. PN GW sends a StatusNotify message to PNE2; 8. PNE2 updates the Active attribute of PNE1 to “True” at it PN Inventory.
Pass-Criteria	1. The Active attribute of PNE1 on its PNInfo in the PN Inventory of PNE1, PNE2, PN GW and CPNS server is equal to “True”.

Table 53: Test Information for CPNS-1.0-int-53 Interoperability Test

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-ETS-CPNS-V1_0	10 Mar 2011	All	Initial draft
	19 Jan 2011	Chapter 6	Added all the test cases approved to date
Candidate Version OMA-ETS-CPNS-V1_0	21 Feb 2012	All	Updated to the 2012 Template Status changed to candidate by TP TP ref# OMA-TP-2012-0046-INP_CPNS_1.0_ETS_for_Candidate_approval