TARGET Instant Payment Settlement

TIPS

Connectivity Guide

0.9

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1. Scope

The aim of the Connectivity Guide is to provide the TIPS actors with the relevant guidelines for establishing a technical connection to TIPS. Basically this document describes the process to registrer to TIPS and to select a Network Service Provider (NSP):

- User Registration
- NSP Sponsoring and Compliance check

This document is organized as follows:

Section 2 describes the connectivity model used by TIPS.

Section 3 describes the User Registration and Compliance Check processes, providing a step-by-step guide to allow the connection to TIPS.

Finally sections 4 and 5 describe additional NSP duties.

2. TIPS connectivity overview

2.1. Global picture

The TIPS Actors (Central Banks, TIPS participants, TIPS Reachable Parties and TIPS Instructing Parties) can choose their preferred Network Service Provider (NSP), provided that the selected NSP fulfils the TIPS Connectivity Requirements and has passed the Compliance Check done by the TIPS Operator.

The TIPS Actor and an NSP can establish a contractual relationship only after the successful completion of the compliance check phase.

The NSP shall provide the following services**:**

- o Network connectivity;
- o Messaging services in U2A and A2A mode;
- o Security services: PKI and closed group of user (CGU) management;
- o Operational services: Support and incident management.

2.2. Connectivity

TIPS supports the connectivity of TIPS Participants as follows:

- Single messages may be sent in Application-to-Application mode (A2A) as well as through online screens in User-to-Application mode (U2A).
- For the A2A communication mode, TIPS communicates with the participants using only "stateless" messages in ISO 20022 format and it does not support "store-and-forward" services. In all other cases, i.e. when the usage of ISO 20022 standard is not required or not

possible for technical reasons (e.g. performance constraints) raw data files may be used for both inbound and outbound communication.

- The participants must always subscribe to both U2A and A2A services[1].

An open connectivity model was selected where any provider matching a set of requirements could connect to the TIPS platform. This model is called "Tower of Babel" and it foresees that a multitude of providers could participate. The ideal participants to the open connectivity model are the major NSP carriers in the European telecommunications market. The Tower of Babel connectivity model presents the maximum possible flexibility, since the TIPS participants can choose any provider on the carrier market respecting the connectivity requirements.

Assuming all major NSPs are allowed to access the platform the following picture summarizes this network connectivity model:
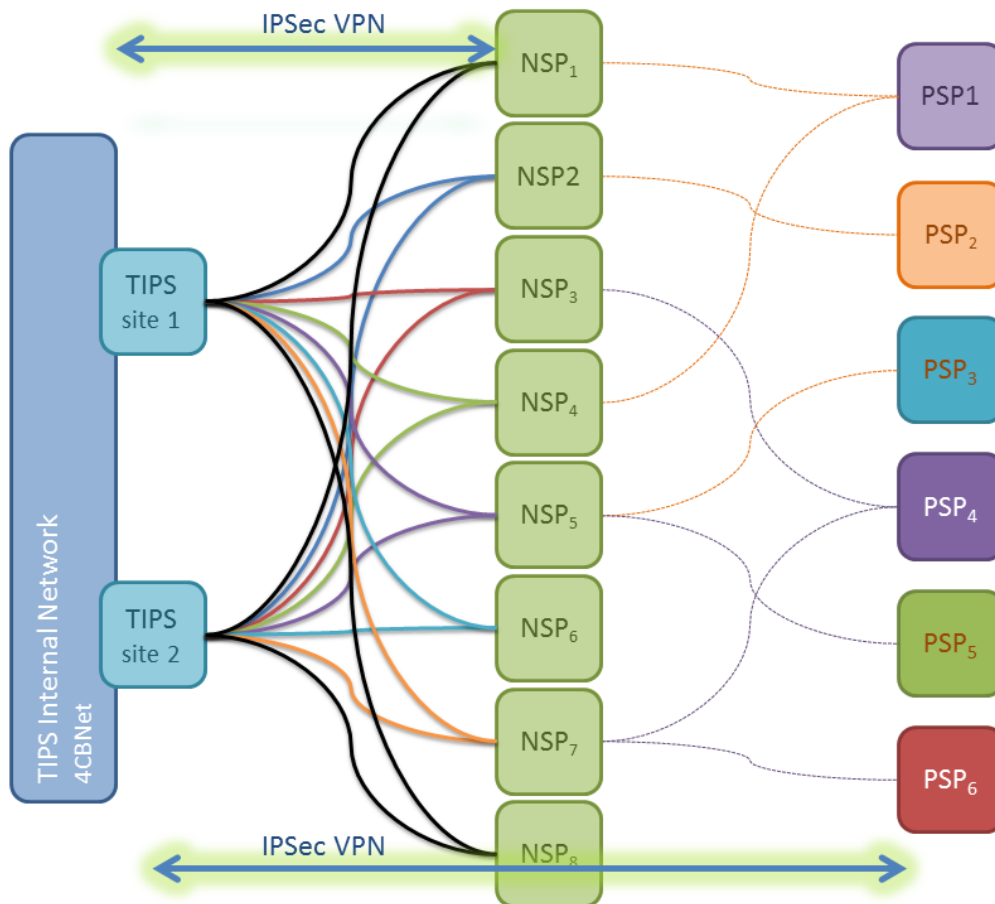

FIGURE 1 – TOWER OF BABEL CONNECTIVITY MODEL

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[1] For the reference data management the Central Banks can subscribe the U2A service only.
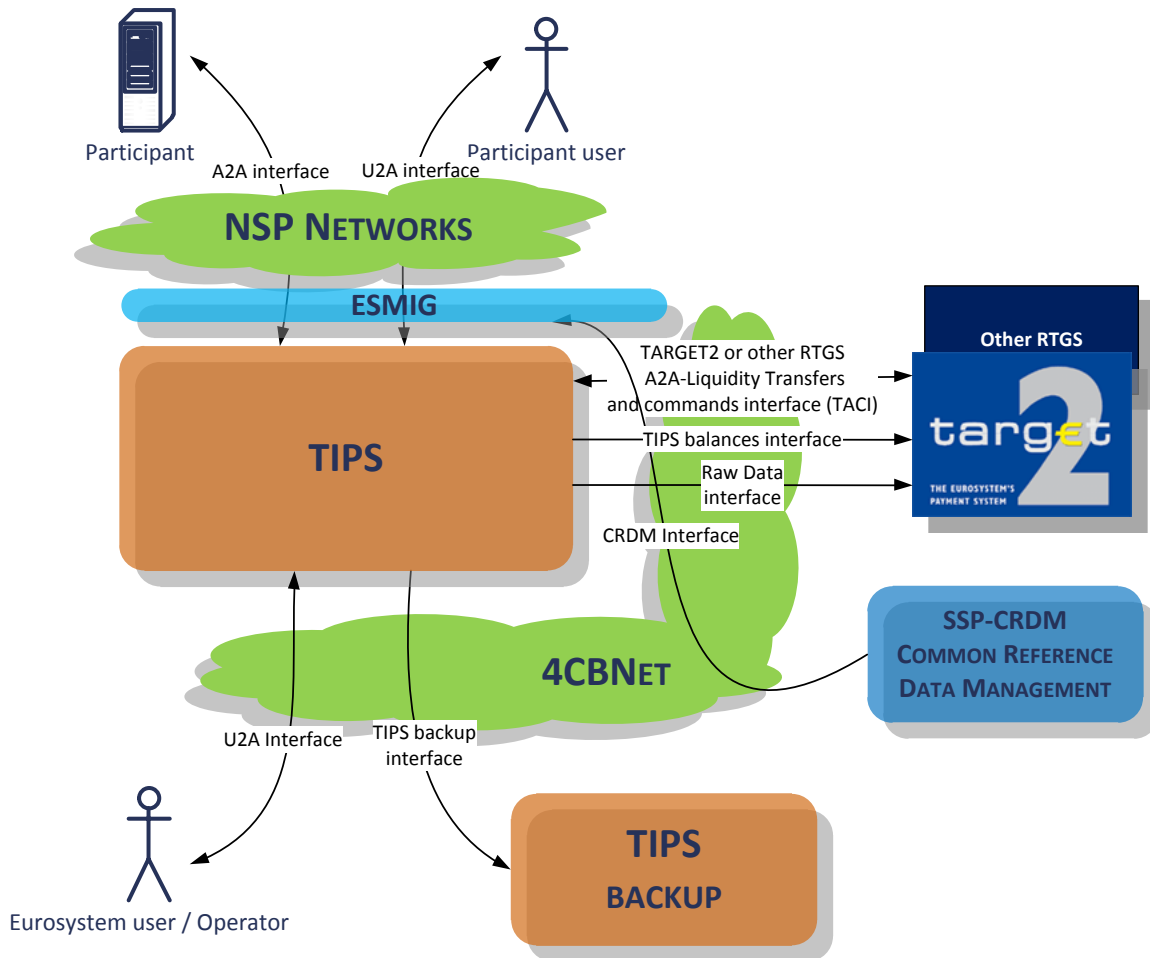
FIGURE 2 – TIPS OVERALL DIAGRAM AND TYPES OF NETWORKS

2.3. The communication modes

TIPS Actor applications and end-users can communicate with TIPS in two different modes: **Application to Application (A2A)** or **User to Application (U2A)**.

2.3.1. A2A Instant messaging

For the A2A instant messaging mode, the TIPS Platform communicates with its participants only using "stateless" messages and it does not support "store-and-forward" services. This implies that if the receiver is unavailable no retry mechanism is in place.

Any communication is in "push" mode, both from the TIPS application to the TIPS actor and from the TIPS actor to the TIPS application.

The exchange of data between the Actor and the NSP is compliant with a protocol defined by the relevant NSP. The NSP offers connectivity services and manages the bi-directional data exchange with TIPS Platform.

The NSP provides several functionalities: Technical Sender Authentication, CGU, non-repudiation, encryption, NSP protocol transformation into and from the TIPS protocol.

2.3.2. A2A File store and forward

The file transfer in store and forward mode enables a sender to transmit messages or files even when a receiver is unavailable. If the receiver is temporarily unavailable, the NSP stores the files for 14 calendar days and delivers them as soon as the receiver becomes available again.

File transfer mode is used by TIPS Platform only for outgoing exchanges, there is no business case which foresees its use for communications from the TIPS actor to the TIPS platform.

2.3.3. U2A channel

The U2A interface between TIPS and the NSP is based on the standard HTTPs protocol; therefore HTTPs traffic between the users' workstations and the TIPS platform must be enabled on the network devices on the Actor's side and on the TIPS entry firewall. In this context the NSP has to provide mainly connectivity, CGU and PKI services.

Actor identification and authentication is based on the same digital client certificate used to establish the HTTPs session with the TIPS platform. The certificates are provided by the NSP and stored with the related private keys in a smart-card or USB token which is assigned to the relevant end-users.

3. User Registration and Compliance check processes

TIPS Actors have to apply for a registration process before starting to use the TIPS services. The registration process includes two sub-processes: the User Registration to TIPS and the NSP Compliance check; they can be carried out in parallel but both of them must be concluded successfully in order to consider the process completed.
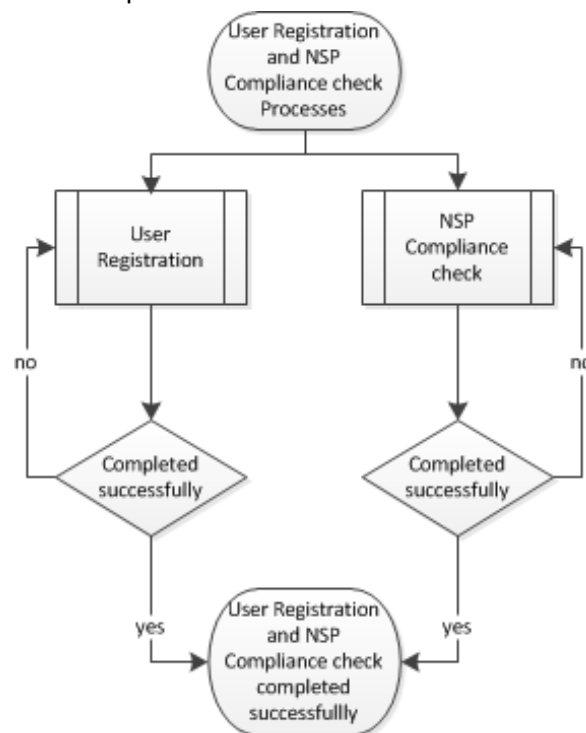

FIGURE 3 – USER REGISTRATION AND COMPLIANCE CHECK PROCESSES

The User Registration process is the set-up of the TIPS actor reference data and TIPS account configuration. It also includes the Closed Group of Users (CGU) registration with the NSP (once the latter has passed the compliance check).

The NSP compliance check aims to ensure that the NSP selected by the TIPS actor is technically compliant with the TIPS Connectivity requirements. If a TIPS participant selects an NSP that is already compliant, only the User Registration part will be necessary.

3.1. NSP sponsoring and compliance check

Central Banks and TIPS Participants can sponsor a NSP and then drive it through the compliance check process that is performed by the TIPS operator.

The NSP compliance check process aims to ensure that the Connectivity Solution provided by the NSP chosen by the TIPS Actor fulfils the requirements described in the TIPS Connectivity Requirements.

It will not be possible to start any new compliance check in the 6 months following the Go-live.

Some steps of the process will differ according to whether the NSP is sponsored by a Central Bank or by a Participant.

3.1.1. NSP sponsored by a TIPS Participant

TIPS participants can sponsor one NSP through their responsible CB. The CB then notifies the TIPS Operator and the NSP. The NSP contacts the TIPS operator to start the compliance check. At the end of the process, if the compliance check is successful, the NSP connectivity solution will be made available to any TIPS Actor.

For this purpose the relevant CB will send an official communication to the requesting TIPS participants and to the ECB to include the NSP to the List of the Compliant TIPS NSPs.

If the sponsored NSP is already compliant, the TIPS actor can proceed directly to the User Registration to TIPS through its responsible CB.
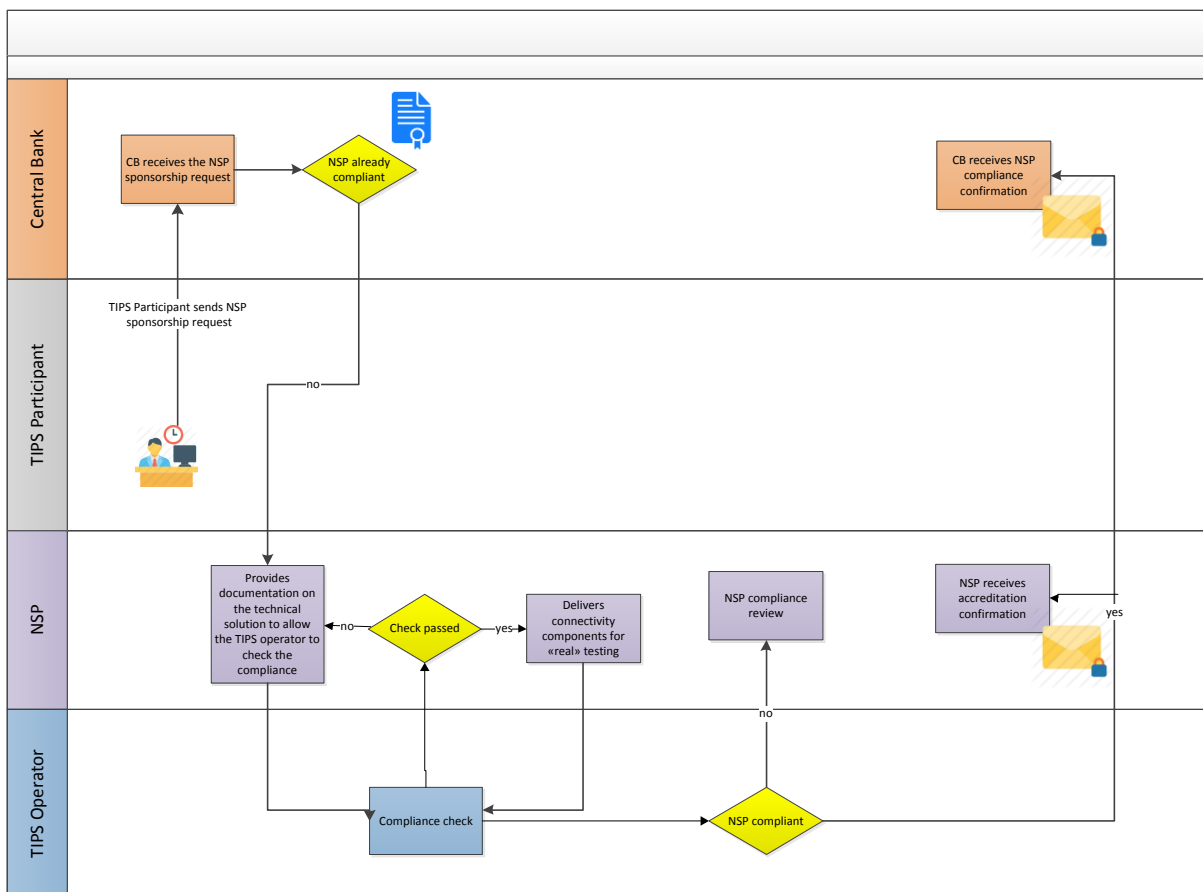

FIGURE 4 – NSP COMPLIANCE CHECK PROCESS FOR A TIPS PARTICIPANT

1. A TIPS Participant sends a NSP sponsorship request to their CB using a specific form[2].

2. The CB receives the NSP sponsorship request.

    a. If the NSP is already compliant, the CB communicates the positive feedback to the TIPS Participant and to the TIPS Operator. In this case, the NSP has to ensure the scalability of its infrastructure in order to include the new participant without failing to comply with the performance requirements.

    b. If the NSP is not already compliant, the CB initiates the compliance check process by asking the NSP to provide the necessary technical documentation to allow the TIPS operator to check the compliance.

3. The Compliance check starts.

4. The NSP delivers the documentation regarding their technical solution to the TIPS operator.

    a. If the documentation check is successful, the NSP delivers the connectivity components needed for the second part of the compliance check which is based on an integration testing phase with a basic setup.

    b. If the documentation check is not successful, the process is finished. The NSP may join the following compliance check window.

5. Once the NSP has delivered the infrastructure, the TIPS Operator executes the compliance check testing.

6. If the compliance check is completed successfully the NSP is certified as TIPS compliant and the relevant CB communicates the positive feedback to the TIPS Participant and to the ECB in order to include the NSP to the List of the Compliant TIPS NSPs.

7. If the compliance check is completed unsuccessfully, the process is finished. The NSP may join the following compliance check window.

3.1.2. NSP sponsored by a Central Bank

The NSP registration process is slightly different if it is requested by a Central Bank. The steps to be performed are highlighted in the following graph.
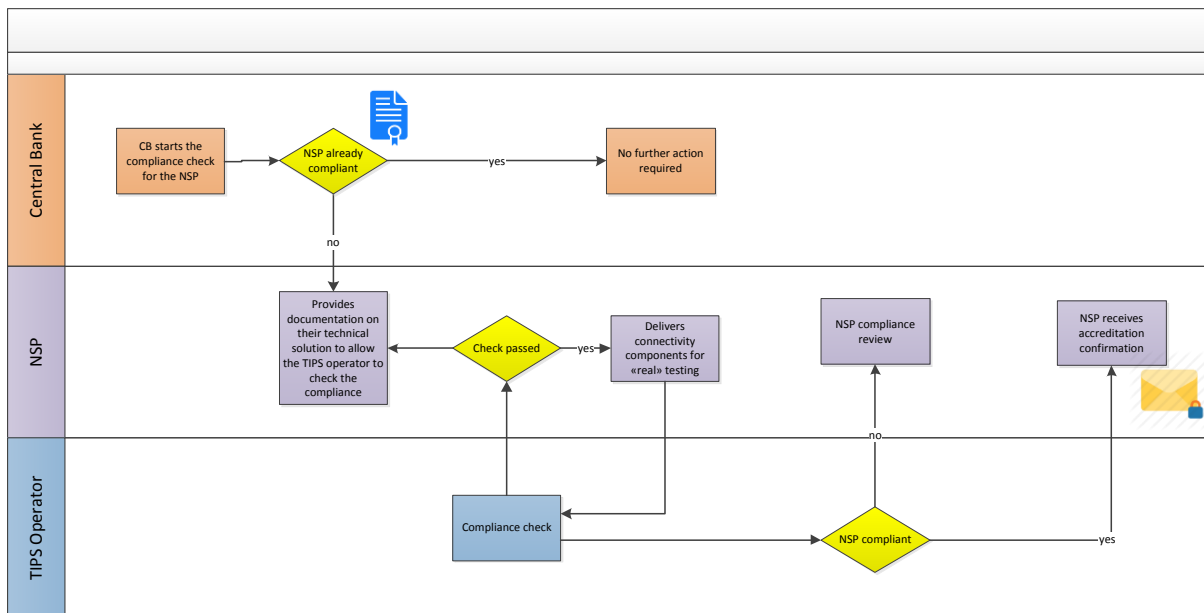
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[2] Form to be provided

FIGURE 5 – NSP COMPLIANCE CHECK PROCESS FOR A CENTRAL BANK

1. If the CB chooses an already compliant NSP, the process is finished. The NSP has to ensure the scalability of the infrastructure in order to include the new participant without failing to comply with the performance requirements.

2. If the NSP is not already compliant, the CB initiates the compliance check process by asking the NSP to provide the necessary technical documentation to allow the TIPS operator to check the compliance.

3. The Compliance check starts.

4. The NSP delivers the documentation regarding their technical solution to the TIPS operator.

    a. If the documentation check is successful, the NSP delivers the connectivity components needed for the second part of the compliance check which is based on an integration testing phase with a basic setup.

    b. If the documentation check is not successful, the process is finished. The NSP may join the following compliance check window.

5. Once the NSP has delivered the infrastructure, the TIPS Operator performs the compliance check testing.

6. If the compliance check is completed successfully the NSP is certified as TIPS compliant and the CB communicates the positive feedback to the ECB in order to include the NSP in the List of Compliant TIPS NSPs.

7. If the compliance check is completed unsuccessfully, the process is finished. The NSP may join the following compliance check window.

3.1.3. NSP change process

TIPS actors can change the NSP currently used to access the TIPS services; in this case two sub-processes shall be followed:

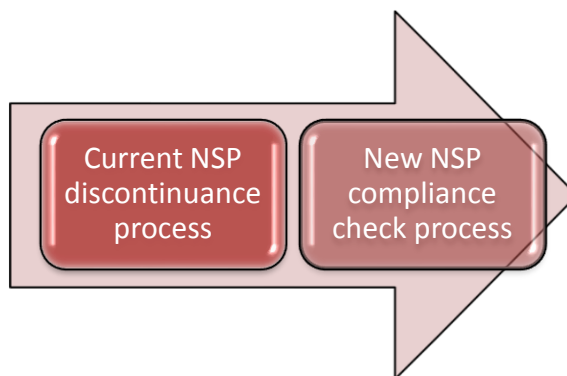1. Current NSP discontinuance process
2. New NSP registration process

FIGURE 6 – NSP CHANGE PROCESS

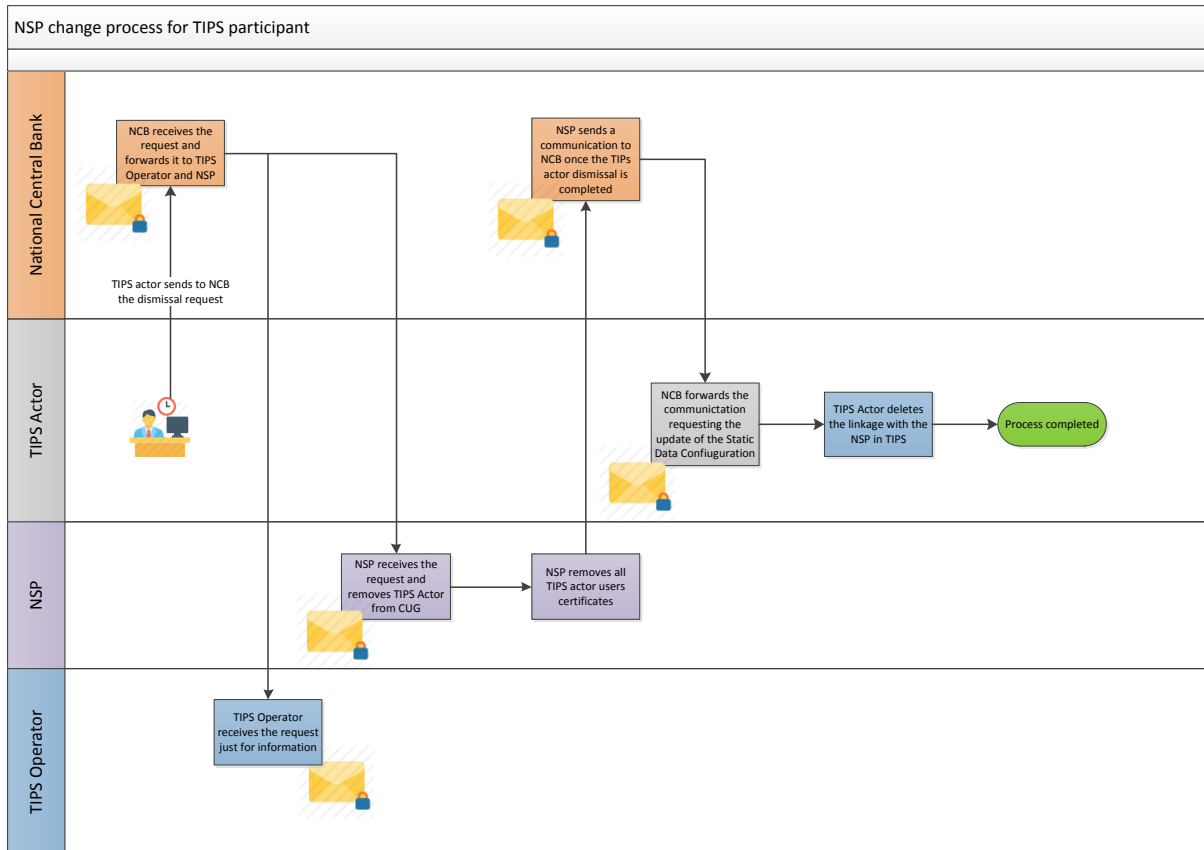The NSP dismissal process for a TIPS actor is the following:

FIGURE 7 – NSP DISMISSAL FOR A TIPS PARTICIPANT

1. The TIPS actor sends a communication to the CB requesting the dismissal of the currently used NSP

2. The CB forwards the email to the NSP

3. The NSP removes the TIPS Actor from the CGU

4. The NSP sends an email to the CB in order to confirm the completion of the activities

5. The CB updates the Reference Data in TIPS

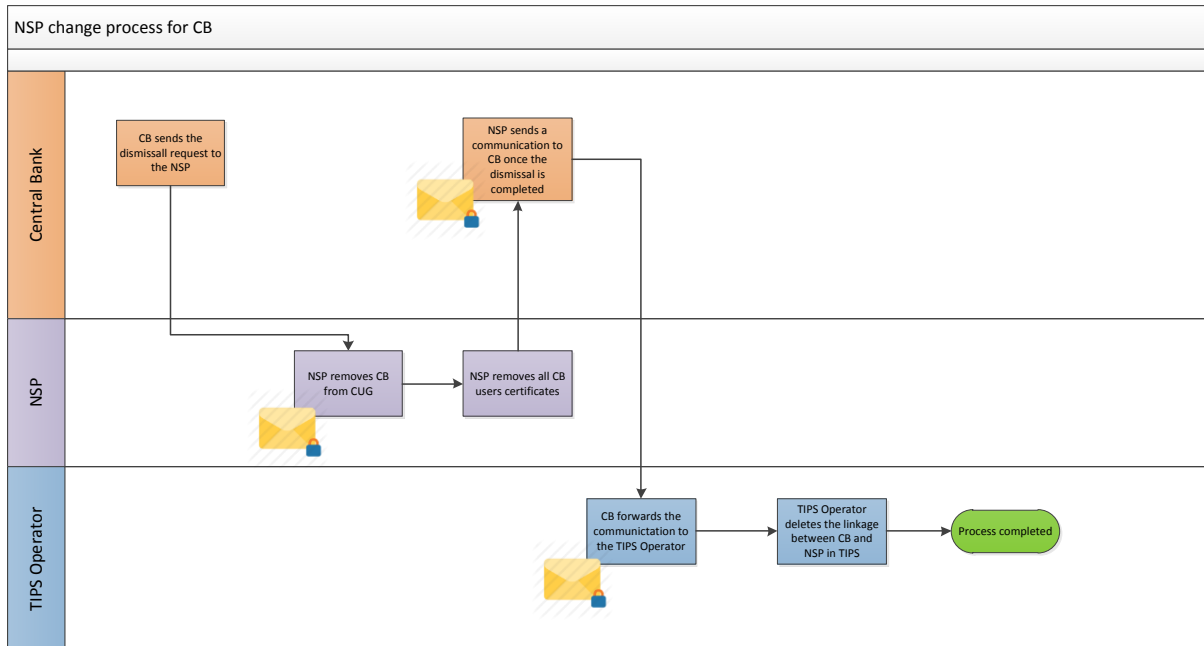The NSP dismissal process for a CB is the following:

FIGURE 8 – NSP DISMISSAL FOR A CB

- The CB sends the dismissal request to the NSP
- The NSP checks the validity of the signature and removes the CB from the CGU
- The NSP sends an email to the CB to confirm the completion of the activities
- The CB sends a request to the TIPS Operator in order to update the Reference Data
- The TIPS Operator proceeds with the update of the Reference Data in TIPS

The new NSP registration process is the same as the one described in 3.1.1.

3.2. User Registration process

3.2.1. **TIPS Reference Data setup**

The TIPS service is able to deal with different actors, defined by different access rights.

These actors are Central Banks, Participants, Reachable Parties, Instructing Parties (which can act on behalf of Participants and Reachable Parties), RTGS Systems and the TIPS Operator.

Central Banks maintain all the reference data related to entities belonging to their national community and for which they are responsible for (e.g. the setup and maintenance of a Participant and their accounts).

Reachable Parties and Instructing Parties are considered to be reference data of the responsible Participant. Central Banks can act as Participants and own accounts which can be used for their instant payment business.

Participants are entities which are identified by BICs and which own TIPS accounts and CMBs linked to their accounts. They are responsible for the configuration of CMBs linked to their accounts.

Reachable Parties are entities which are identified by BICs but do not own any account and have to rely on a Participant to allow them to use an account or a CMB. Reachable Parties can interact with TIPS directly and if they take on the role of an Instructing Party they can also send messages, e.g. payment transactions. However, the responsibility for all the actions done by Reachable Parties lies with the Participants owning the TIPS accounts or CMBs used in the transaction.

Instructing Parties are entities which are acting on behalf of Participants or Reachable Parties and communicating with TIPS directly. Participants and Reachable Parties can act as Instructing Parties and impersonate them. Participants are able to restrict the capabilities of Instructing Parties which act on behalf of the Participant or a Reachable Party. The responsibility for all the actions done by Instructing Parties lies with the Participant.

According to the above definitions the registration process is under the responsibility of the Central Banks which are in charge of the participants reference data set-up. The overall registration process is described below:
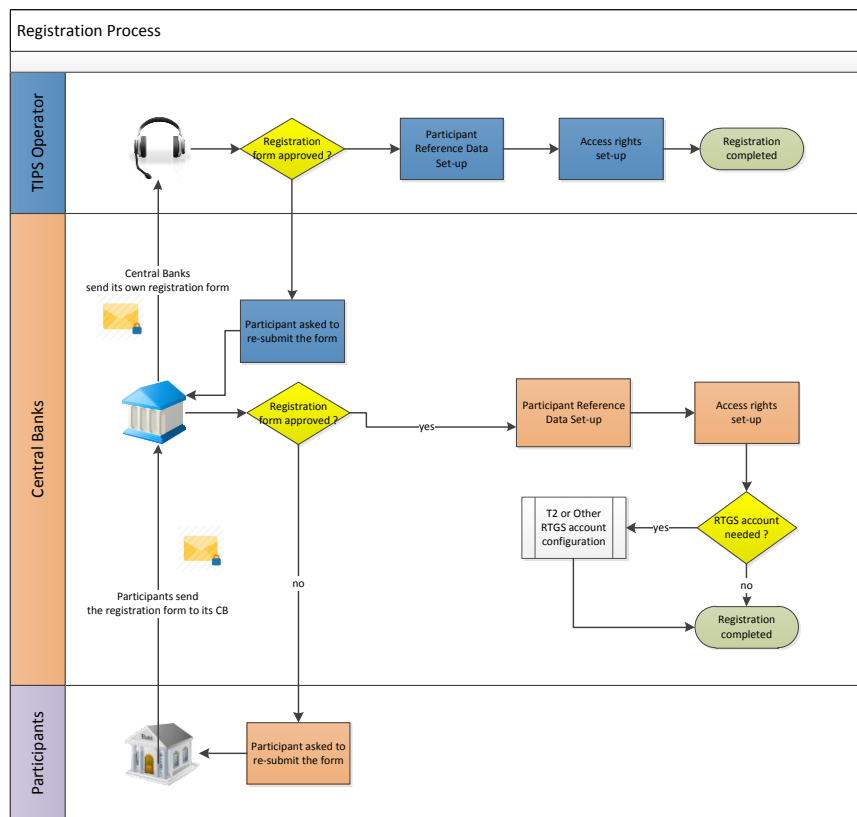
FIGURE 9 REGISTRATION PROCESS

1. Participants send the registration form to their CB, also on behalf of their reachable and instructing parties.

2. The CB validates the signature and checks the completeness and correctness of the form. On the basis of the results of the check, the CB can approve the form and continue the process or ask the TIPS participant to review and resubmit it.

3. The CB checks if the requestor is compliant with the TIPS requirements (same as TARGET2). If the requirements are not met the process is temporarily suspended or definitively stopped. It is up to the CB to make this decision.

4. If the TIPS requirements are met the CB completes the capturing of the reference data and access rights set-up. If an RTGS account has to be configured as well, the CB will be in charge of all the related checks and activities according to the current TARGET2 or other RTGS certification process (out of scope of this document).

As described above, Central Banks can also act as a Participant. In this case the TIPS operator will be responsible for setting-up their reference data:

- The CBs send the registration form to the TIPS Operator.

- The TIPS Operator validates the signature and checks the completeness and correctness of the form. On the basis of the results of the check, the TIPS Operator can approve the form and continue the process or ask the CBs to review and resubmit it.

- If the form is approved, the TIPS operator completes the reference data and access rights set-up.

3.2.2. CGU subscription

The NSP shall allow the creation and removal of logically segregated groups of TIPS Actors or end users. In particular, the NSP shall create and manage groups of TIPS Actors or end users for both the production environment and the test & training environment, one group for each environment.

The subscription to a group of users, and any subsequent modification to such subscription, shall be arranged through an electronic workflow on the Internet. All the electronic forms shall be authorized by the relevant Central Bank and the TIPS Operator.

The activation date for the subscriptions shall be set at the latest within two weeks after the form's approval by the TIPS Operator; the new subscription shall be scheduled and activated ensuring the availability of the service (e.g. adopting the "rolling update" approach). Upon request from the TIPS Operator, the NSP shall withdraw from the CGU a TIPS Actor or an end user within one hour.

The CGU subscription includes a two steps approval workflow as described in the figure below :
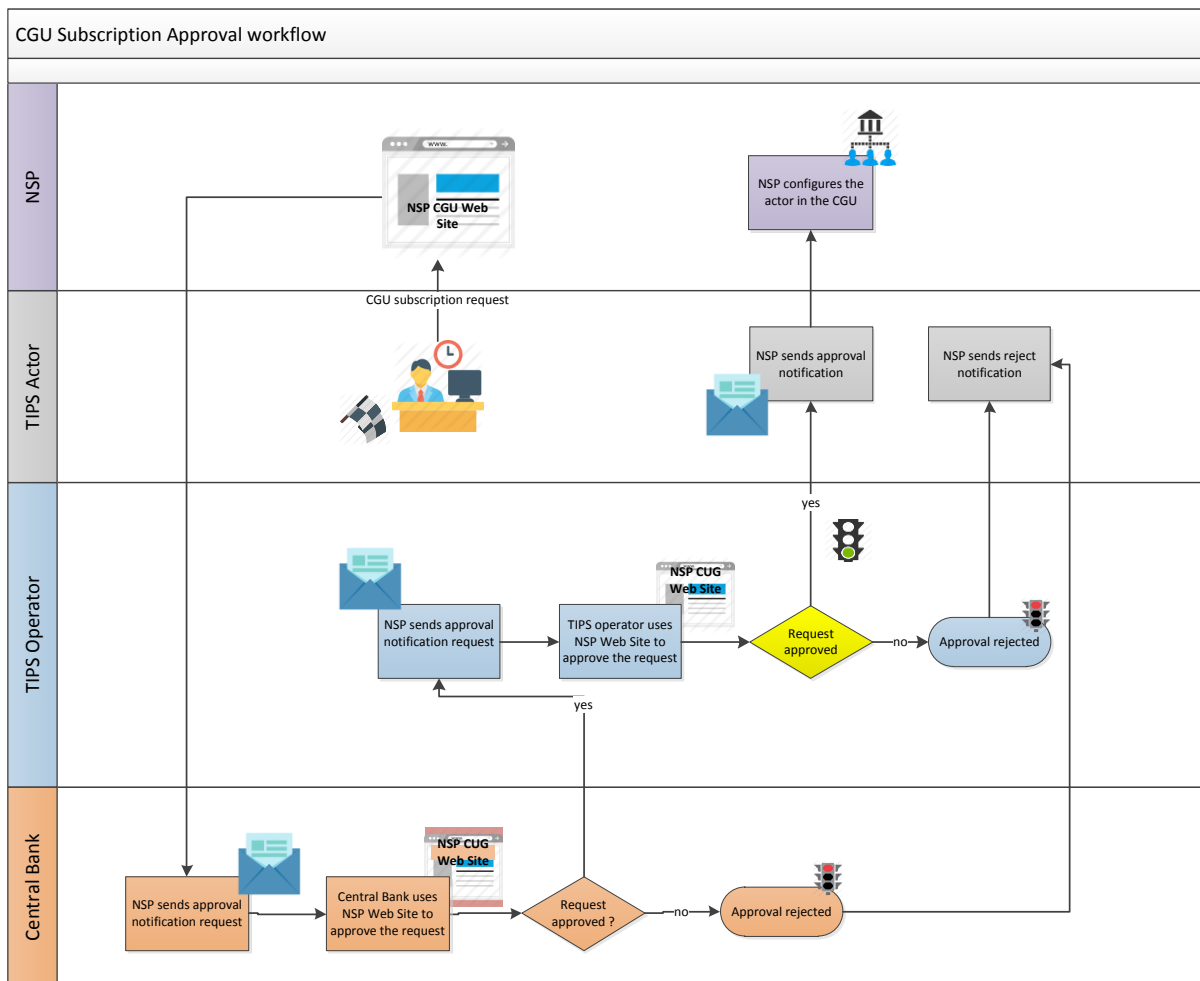
FIGURE 10 – CGU SUBSCRIPTION WORKFLOW

In case of modification, the TIPS actor undergoes the change process as defined by the NSP, who receives the request and performs the standard validation against the information provided.

If the validation is successful, the NSP evaluates if the order contains a change of the CGU.

If there is a change of the CGU, the following approval flow is foreseen:

- Dual approval is requested for orders submitted by TIPS Actor:
  - The first approval is done by the responsible CB;
  - The second approval is done by the TIPS Operator.
- Single approval is requested for orders submitted by CB:
  - The approval is done by the TIPS Operator.

For all other types of changes (e.g. the technical parameters), no external approval is required and the technical implementation can be executed by the NSP autonomously.

3.2.3. Request for Digital Certificates to the NSP PKI

The NSP PKI provides digital certificates of the following kind:

- for the U2A channel: certificates on a smart-card or USB token;
- for the A2A channel: certificates on HSM for live traffic.

The procedure to procure the certificates is described in the NSPs User documentation.

4. NSP documentation

The NSP shall provide all the necessary documentation regarding the access to A2A/U2A services so that the TIPS actors can connect to TIPS, including details on:

- TIPS relevant URLs (GUI, Trouble Management System and so on)
- TIPS GUI Operability Requirements – needed hardware/software configuration to access TIPS GUI
- Access to the A2A services – addressing rules for Message/File exchange

5. Troubleshooting and support

For technical problems regarding the NSP connectivity, depending on the nature of the issue, the first level of support can be provided either by the NSP of choice or by the TIPS Service Desk. In case of doubt, the TIPS Service Desk should be contacted.

In case of need, the NSP's support and the TIPS Service Desk can cooperate by means of a joint teleconference with the TIPS actor.

6. Appendix

6.1. References

TIPS User Requirements (final, v1.0 – 21/06/2017)
TIPS Connectivity – Technical Requirements (draft v1.0 – 21/04/2017)
TIPS Compliance Check

6.2. Naming conventions and acronyms

Acronym	Description
A2A	Application to Application
ACH	Automated Clearing House
CB	Central Bank
Credit Memorandum Balance - CMB	A balance limit linked to a TIPS Account representing un upper cumulative limit to payments that can be settled by a specific client. Any number of CMBs can be defined on each TIPS account, allowing TIPS participants to manage their clients' limits.
ESMIG	European Single Market Infrastructure Gateway.
Instant Payment	A type of payment that can be executed 24 hours a day, any day of the year, and resulting in the immediate or close-to-immediate interbank clearing of the transaction and crediting of the payee's account with the confirmation to the payer within seconds of payment initiation. This is irrespective of the underlying payment instrument used and of the underlying arrangements for clearing and settlement that makes this possible.
Instant Payment Order	An order or message requesting the transfer of funds from a debtor to a creditor by means of an instant payment.
Liquidity Transfer	Message requesting a transfer of liquidity between a TIPS account and the relevant RTGS account, or between two TIPS accounts belonging to the same legal entity.
NRO	Non Repudiation of Origin
NSP	Network Service Provider
PSP	Payment Service Provider
SCT-Inst	An instant payments scheme based on SEPA Credit Transfer proposed by the European Payments Council and approved following a public consultation concluded in November 2016.
SEPA	Single Euro Payments Area
Single Shared Platform - SSP	An integrated central technical infrastructure operated by Banca d'Italia and Deutsche Bundesbank that provides the TARGET2 and TARGET2-Securities services.
TARGET Instant Payments Settlement -TIPS	An instant payments settlement solution based on the SCTinst scheme, as described in this paper.
TARGET2	The real-time gross settlement system for the euro. TARGET2 settles payments in euro in central bank money and functions on a single IT platform, to which all payment orders are submitted for processing. This means that all payments are received in the same technical format.
TIPS	See TARGET Instant Payments Settlement
TIPS Account	A cash account opened in TIPS for the settlement of instant payments. Each TIPS account belongs to a single TIPS participant.
TIPS Operator	The central operator of TIPS, i.e. the Single Shared Platform Operator, carrying out day-to-day operations and service desk support.

Acronym	Description
TIPS Order	An order that is processed by TIPS in its input stream, i.e. in strict sequential order. The order can be an instant payment, a liquidity transfer, any command that changes TIPS internal status immediately and must be replicated in all redundant nodes (such as the block of an account), a command that has to be executed in the proper sequence point (such as the snapshot taken reacting to the TARGET2 end of day procedure).
TIPS Participant	An actor who subscribed for the services provided by TIPS. Participants are the only entities that can open accounts in TIPS. They must be eligible to have an account in TARGET2. TIPS accounts in euro shall legally be opened in the TARGET2 component of the responsible Central Bank.
U2A	User to Application

6.3. Index of Figures