Regulation on the interoperability of communications networks and services

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1. Background and legal basis of the Regulation

The objective of this chapter is to provide the readers of Regulation M28 with an overview of the statutes on which the Regulation on the interoperability of communications networks and services is based.

1.1. Finnish legislation

This Regulation issued by the Finnish Transport and Communications Agency (Traficom) is based on section 99, subsection 2 and section 244, paragraphs 3–5, 7–8 and 12–14 of the Act on Electronic Communications Services (917/2014) [1].

Act on Electronic Communications Services
Section 243 Quality requirements for a communications network and service

The Regulation relates to requirements provided in the following subsections of section 243 of the Act on Electronic Communications Services, which state that public communications networks and communications services and the communications networks and services connected to them shall be planned, built and maintained in such a manner that:

1) the technical quality of electronic communications is of a high standard and information security is ensured;

7) the data protection, information security and other rights of users and other persons are not endangered;

8) their billing is reliable and accurate;

10) they function together and can, if necessary, be connected to another communications network;

12) if necessary, terminal equipment meeting the requirements of this Act can be connected to them, and they are, if necessary, compatible with a television receiver that meets the requirements of this Act;

13) the responsible telecommunications operator is also otherwise able to meet its obligations or those imposed under this Act;

Act on Electronic Communications Services
Section 244 Regulations on communications networks and services

This Regulation specifies the above technical requirements of section 243 under section 244, paragraphs 3–5, 7–8 and 12–14, according to which regulations issued by the Finnish Transport and Communications Agency may cover:

3) performance capacity, information security and functionality and their maintenance, follow-up, and network management;

4) procedures in the event of faults and interference, and maintenance of information security and functionality;

5) structure of communications networks and technical characteristics of communications network termination points;

7) technical aspects of billing;

8) interconnection, interoperability, signalling and synchronisation;

12) technical documentation and statistics and the form of related documents and their storage;

13) standards to be complied with;

14) other comparable technical requirements set for a communications network or communications service.

This Regulation lays down the procedures promoting interoperability, elimination of disturbances and performance in telecommunications operators' communications networks and, in particular, between them and at the user-to-network interface (communications network termination point). These also result in requirements concerning network management. Moreover, the Regulation lays down provisions concerning the technical documentation of interfaces between telecommunications operators. The Regulation also contains provisions on signalling and the information provided to the user concerning technical call success, in compliance with specific standards.

The Regulation also lays down procedures for ensuring the validity of calling party numbers and redirecting numbers and the related monitoring statistics.

Act on Electronic Communications Services
Section 99 Traficom numbering regulation

According to subsection 2 of this section, the Finnish Transport and Communications Agency may lay down requirements for the type of numbers, codes and prefixes that may be used in telecommunications and the purpose for which they are to be used as well as the geographical area of use for the numbers, codes and prefixes.

This Regulation provides for the area of use for Finnish telephone numbers, signalling point codes included in codes and prefixes and for the manner in which numbers must be transferred in the interconnection traffic between telecommunications operators.

1.2. EU legislation

The Directive establishing the European Electronic Communications Code [2] regulates the powers of regulatory authorities with regard to interconnection. According to Article 61 of the Directive, national regulatory authorities shall be able to impose obligations on undertakings subject to general authorisation that control access to end-users, to the extent necessary to ensure end-to-end connectivity, or to make their services interoperable. In justified cases, this may also include the obligation to interconnect their networks where this is not already the case.

2. Other related regulations and statutes

2.1. Terminal equipment interfaces

Act on Electronic Communications Services
Section 243 Quality requirements for a communications network and service

According to subsection 5 of section 243 in the Act on Electronic Communications Services, telecommunications operators shall publish up-to-date technical specifications on the public communications network interfaces to which telecommunications terminal equipment can be connected. The specifications shall include sufficiently accurate information serving as basis for the manufacture of

telecommunications terminal equipment and for using services provided via the interface.

This interface for terminal equipment can be considered to be part of the user-to-network interface referred to in this Regulation.

2.2. Applications of the transmission of subscription number information

Act on Electronic Communications Services
Section 79 Collection of telecommunications fees

According to subsection 2 of this section, information on the subscriber connection number of the party liable to pay shall be transmitted during the period of telecommunication. If the transmission of the subscriber number is not technically possible, the telecommunications operator that has entered into the subscriber connection agreement has an obligation to supply the information necessary for billing to another telecommunications operator or, if this is not possible, to collect the fees without a charge.

Act on Electronic Communications Services
Section 132 Subscriber connection identification

According to subsection 1 of this section, a telecommunications operator shall offer a calling line identification service for identification of incoming calls prior to answering. It must be possible to prevent displaying the caller's number on the receiving subscriber's telephone.

According to subsection 2, a telecommunications operator offering a calling line identification service shall offer subscribers an easy way of barring:

1) identification of his or her subscriber connection;

2) identification of the subscriber connections of incoming calls;

3) reception of calls whose subscriber connection identification is barred, if this is technically possible without undue cost; and

4) identification of the subscriber connection to which incoming calls have been forwarded.

According to subsection 3, a telecommunications operator offering a calling line identification service shall offer the user an easy way of barring subscriber connection identification separately for each outgoing call, at no charge.

Act on Electronic Communications Services
Section 134 Bill itemisation and connection-specific itemisation

The section lays down provisions on bill itemisation. Bills must itemise, for example, international calls, long-distance calls, mobile network calls, subscriber connection basic rates, SMS, picture messages and other messages, data transfer services and services provided at additional charges as detailed in the section.

Upon request, a telecommunications operator must provide the subscriber with a connection-specific itemisation of a bill in a form where the last three digits of the phone number are obscured or the itemisation otherwise rendered such that the other party of the communication cannot be identified. A telecommunications operator shall, if the user so requests, release the call itemisation of a bill with the complete phone numbers or other traffic data of communications service of the parties to the

communication. Traffic data of free-of-charge services shall not be indicated in a connection-specific itemisation of a bill.

The Finnish Transport and Communications Agency may issue further regulations on the content and implementation of itemisation.

This Regulation does not provide more specific provisions concerning the matter, but in section 15 of the explanatory notes the Finnish Transport and Communications Agency provides interpretation guidelines for the anonymisation of SIP addresses in an itemisation provided to the subscriber.

Act on Electronic Communications Services
Section 315 General right of access to information of the authorities

The Ministry of Transport and Communications, the Finnish Transport and Communications Agency, the Data Protection Ombudsman, the Consumer Ombudsman and other authorities monitoring compliance with the provisions of this Act are entitled to access information necessary to carry out their duties under this Act from anyone whose rights and obligations are governed by this Act or from anyone acting on their behalf.

Anyone whose rights and obligations are governed by this Act or anyone acting on their behalf, shall be obliged, at request, to collect and, notwithstanding secrecy provisions and other restrictions on the disclosure of information, supply to the competent authorities any information necessary to carry out their duties.

2.3. Technical regulations issued by the Finnish Transport and Communications Agency

The list corresponds to the situation at the time of publication of these notes. All communications-related regulations issued by the Finnish Transport and Communications Agency are included in the Agency's Series of Regulations [3].

Regulation 32 on public telephone network numbering

The regulation contains provisions on the numbers, codes and prefixes used in communications networks. The services provided in communications networks require unambiguous numbering. The regulation contains the Finnish national numbering plan and number structures. It also defines codes and prefixes relevant for the technical interoperability of communications networks.

Regulation 35 on barring services for subscriber connections

The regulation includes provisions on the barring categories for the telecommunications of a subscriber connection in a public telephone network and their technical implementation. According to the regulation, the telephone traffic and short message traffic from a subscriber connection must be grouped into categories in accordance with the regulation, one of which covers traffic to premium rate service numbers.

The regulation includes the categorisation of service numbers into service groups I to IV (non-profit services, consulting and ordering, entertainment services and adult entertainment services) based on the first part of a number.

Regulation 67 on information security in telecommunications operations

The regulation is applied to public telecommunications operations. It contains provisions on information security measures in all communications networks and

services, specific information security requirements for interfaces and specific requirements for internet access services and email services. The regulation also lays down obligations to inform customers about information security measures and certain matters related to internet access services and email services.

3. Objective of the Regulation

The objective of this Regulation is to promote the interconnection of different telecommunications operators' communications networks and services as well as the end-to-end interoperability of communications services. The objective is to prevent problems related to the interconnection of communications networks and services and thereby to promote the introduction of new services.

The purpose of the Regulation and the accompanying recommendations is to promote solutions that telecommunications operators consider good, thereby facilitating the required coordination and testing and providing cost savings.

The Regulation also aims to ensure that telecommunications operators have described their network-to-network (NNI) and user-to-network interfaces (UNI) in sufficient detail. The objective of these documentation obligations is to facilitate the interconnection of communications networks and services and to improve users' opportunities to choose their preferred terminal or software to use a service.

Another objective of the Regulation is to ensure the operability and validity of the telephone network and the transfer of subscription numbers as well as the validity of the message sender information. Number information and its reliability is important, particularly with regard to charging, but also with regard to the call-back option, emergency response authorities, the police, etc. The Regulation also aims to ensure the validity and unambiguity of calling party numbers and redirecting numbers and the call-back capacity of numbers transferred via the user-to-network interface and to prevent number spoofing and related fraud.

4. Drafting process

The amendments to the Regulation are based on the work of a recommendation working group at the Finnish Transport and Communications Agency and the group's recommendations to telecommunications operators about detecting and preventing caller ID spoofing [4]. The proposed amendments have been discussed at the meetings of the working group drafting the recommendation during the spring of 2023. This means that key telecommunications operators and service providers have been closely involved in the drafting of the Regulation.

The draft regulation was put out for consultation via the lausuntopalvelu.fi website from 24 July 2023 to 31 August 2023. Information on the opportunity to comment on the draft was sent to the telecommunications operators on the Finnish Transport and Communications Agency's distribution list for technical regulations on communications matters and the Agency's recommendation, numbering and NGN working groups. In addition, Digital Forum Finland Ry, Confederation of Finnish Industries (EK), Finnet-liitto ry, Suomen Telemarkkinointiliitto ry (a non-profit association promoting the prohibition of telemarketing), Suomen Yrittäjät (a national interest and service organisation for small and medium-sized enterprises) as well as the Finnish Federation for Communications and Teleinformatics FiCom were notified about the consultation.

5. Comments received through consultation and processing them

While the draft was out for consultation, the Finnish Transport and Communications Agency received six comments from the following parties: DNA Plc, Finance Finland, the Ministry of Transport and Communications, Suomen Yrittäjät, Telia Finland Oyj and the Finnish Federation for Communications and Teleinformatics FiCom.

Entry into force and transitional provisions

Finance Finland responded that the amendment to the Regulation was very welcome and hoped that it would enter into force on 2 October 2023 as proposed and that the transition period set on the necessary changes would be as short as possible.

The Finnish Federation for Communications and Teleinformatics FiCom stated that it was in favour of the goal and purpose of the Regulation, but that the Regulation's schedule of entry into force on 2 October 2023 was not realistic. FiCom stated that during the further preparation of the proposal, Traficom and the telecommunications operators should review matters related to the entry into force and the transition period together. DNA and Telia also gave a statement on the transition periods and wished for more discussion related to the Regulation.

After the post-consultation discussions carried out:

- DNA stated that a system change is necessary for the administration of the SMS Sender IDs to be registered, and that the protections can be deployed in production on 1 February 2024 at the earliest.

- Telia stated that changing the service numbers to the format "Tuntematon" (Unknown) is technically possible, if an unambiguous list of the service numbers is available. According to Telia, a transition period until at least 15 January 2024 is needed for the entry into force of the obligation so that the operators can conduct the necessary tests and receive support from the equipment supplier, if necessary.

The Finnish Transport and Communications Agency Traficom has responded to the questions asked by the different telecommunications operators about the draft regulation in writing, and in addition, Traficom has reviewed the questions of DNA Plc and Telia Finland Oyj in dedicated meetings with the telecommunications operators and taken the comments received from the telecommunications operators into account with regard to the entry into force and the transition periods that the telecommunications operators wished for.

Other requests for specification

DNA proposed the specification of some sections of the explanatory notes, such as the public international interface and the definitions of service numbers, in order to avoid ambiguity in interpretations. Telia also wished for more discussion about the Regulation and the interpretation of its sections.

The Finnish Transport and Communications Agency reviewed the questions presented in the comments together with the operators that gave the comment and specified the sections of the explanatory notes mentioned in the comments and discussions. In the Regulation, service numbers were specified to refer to the SMS numbers in accordance with Annex 2 to Regulation 32 and the obligation to block text messages with a clearly incorrect number in the international interface that had been added to the Regulation was removed.

Telia has stated that with MMS, it is not technically possible to differentiate between MMS traffic coming from Finland on the one hand and from abroad on the other hand.

The Finnish Transport and Communications Agency notes that this is an old requirement on customer interfaces, and it is not necessary to differentiate between MMS traffic coming from Finland on the one hand and from abroad on the other hand in this regard. Therefore, no changes concerning the matter were made to the Regulation.

The Ministry of Transport and Communications and Suomen Yrittäjät responded that they had no comments on the contents of the amendments to the Regulation. The Finnish Transport and Communications Agency interprets the small number of comments received to mean that the other telecommunications operators that participated in the drafting process and did not submit any comments also have no objections to the draft.

6. Changes and impact assessment

The purpose of this chapter is to give the readers of the Regulation an overview of the key changes made to the Regulation, an estimate of the impacts of the Regulation and additional information about the revision history of the Regulation.

6.1. Key changes

These explanatory notes have been updated on 10th June 2024. In connection with the update, a reference to the standard specifying the character set to be used in the SMS Sender IDs has been added.

A new obligation has been added to section 10 of the Regulation on blocking text messages coming from the public international interface when the calling party number is a Finnish telephone number. When the calling party number of a text message coming from the public international interface is an SMS number, the telecommunications operator must change it to "Tuntematon" (Unknown) and no text messages with this identifier will be received from the public international interface.

Likewise, a new obligation on blocking text messages coming from APIs and international interfaces has been added to the Regulation when the sender of the message is a protected SMS Sender ID, if their sender is not verified as the legal person that has registered said ID.

6.2. Assessment of the impacts of the Regulation

The Regulation prohibits the use of Finnish telephone numbers abroad as calling party numbers in text messages. Therefore, the change affects the users of the numbers and telecommunications operators that have implemented Finnish numbers abroad against the numbering decisions.

Spoofing the SMS Sender ID to appear as a Finnish telephone number is a method widely used by criminals. The prevalence of SMS Sender ID spoofing is also apparent from the number of incidents reported to the police that involve the victim losing money from their account. In many cases, the victim does not fully understand what has happened when they file the police report. These types of fraud are filed under means of payment fraud, for example. They have increased by over 50% between 2021 and 2022. Based on statistics published by Finland's National Bureau of Investigation, in June–August 2022 there were approximately 750 recorded cases of fraud involving criminals impersonating banks in Finland, resulting in approximately EUR 2.5 million in criminal proceeds. According to the reports, 600 cases involved text messages sent in a bank's name. The prohibition and the related restrictive

measures added to the Regulation can be estimated to make fraud significantly more difficult to carry out and thereby reduce the amount of money lost to criminals. The measure will reduce the risk of citizens becoming victims of a crime.

The arrangement requires changes in the mobile network operators' own mobile networks. This will result in costs for telecommunications operators, but based on the consultation, none of the operators suggested that the changes would be particularly difficult or expensive, and the measures can be considered as justified in relation to the benefits gained.

The Finnish Transport and Communications Agency does not know how many user organisations the prohibition on the use of numbers and the related restrictive measures will affect, and the companies using the numbers will be responsible for the matter. When a similar measure was taken concerning calls in 2022, the Finnish Transport and Communications Agency was contacted a few times concerning problems, but these, too, could be resolved relatively easily. Therefore, it is to be expected that this change will not cause excessive problems to organisations sending text messages, either.

In the discussions with various parties during the drafting process, no one expressed any views that would give reason to suspect that the related costs would be unreasonable in relation to the benefits gained with the Regulation.

6.3. Version history

Regulation 28 J/2022 M

References to sections have been amended to correspond to the Act on Electronic Communications Services (917/2014) [1], and the structure of the Regulation and the related explanatory notes has been changed to comply with the new regulation drafting guidelines of the Finnish Transport and Communications Agency. For example, section 1 (Objective of the Regulation) has been omitted, and references to sections and subsections are no longer used. As a result, the former section 5, subsection 3 is now referred to as section 5.3 of the Regulation. The contents of the Regulation and the explanatory notes have also been reorganised.

Section 7 has been added to the Regulation. Its provisions determine the geographical area of use of Finnish telephone numbers to cover Finland. Based on this, the use of Finnish telephone numbers as calling party numbers and redirecting numbers abroad is forbidden. However, the section allows derogations for roaming and situations where traffic is directed to Finland so that the subscriber using a Finnish telephone number can be identified and the subscriber's right to use the telephone number can be verified.

In section 10, new obligations have been added requiring calls terminating from the public international interface to be blocked when the calling party number is clearly incorrect or the calling party number is a Finnish telephone number and the situation does not involve roaming. Instead of blocking a call, calling line identification is restricted when the redirecting number is an international telephone number and the calling party number is a Finnish telephone number or the calling party number begins with 0435. These new obligations do not apply when the called party number is a Finnish mobile station roaming number (MSRN).

A new section, section 11, has also been added to the Regulation. It contains provisions on the compilation of monthly statistics on calls terminating from the

public international interface and the related measures implemented in accordance with the Regulation.

Regulation 28 I/2014

References to sections have been amended to correspond to the Information Society Code (917/2014) [1], and the structure of the Regulation and the related explanatory notes has been changed to comply with the new regulation drafting guidelines of the Finnish Communications Regulatory Authority (FICORA).

The objective of the Regulation has been added as the first section to the Regulation, and the information security requirements included in sections 3 and 4 of the Regulation have been transferred to a new regulation on information security in telecommunications operations (FICORA 67/2014 M) [5].

Provisions on obligations regarding the documentation of network-to-network interfaces (NNI) between telecommunications operators and user-to-network interfaces (UNI) that were previously included in the documentation regulation (FICORA 41 D/2009 M) that is to be repealed have been included in the Regulation. The requirements have also been specified in some more detail.

The exception concerning corporate subscriptions that was included in the previous regulation allows a telecommunications operator to use, under certain conditions, a number received from a corporate subscription and not belonging to its own number space as the calling party number. The scope of this exception was extended to cover all subscriptions.

Regulation 28 H/2010

The regulation incorporated the requirements for the interoperability of communications networks and services that were previously included in two different regulations. The regulation replaced the following old regulations:

- Regulation on interconnectivity, interoperability and signalling in communications networks (FICORA 28 G/2010 M)
- Regulation on transfer of subscriber's number information in communications networks (FICORA 49 D/2010 M).

Numerous amendments were made to the requirements. Virtually all the requirements, or at least their explanations and application guidelines, were amended. Numerous PSTN/ISDN-based requirements were removed since they were no longer necessary. On the other hand, all-new requirements pertaining to communications networks and services were added to the regulation. The regulation’s scope of application was expanded to comprehensively cover IP-based communications networks and services.

Passages pertaining to all IP-based communications networks and services were transferred to the regulation from FICORA Regulation 13 on information security and functionality of Internet access services. In sections 5 to 10, the IP perspective was related to the consideration of VoIP services in particular.

Summary of key amendments:

A new general section (section 3) on interconnectivity, interoperability and information security in communications networks and services was added to the regulation. It required telecommunications operators to define interface descriptions in accordance with which other telecommunications operators can connect their communications

networks or services to their network. Section 3 of the regulation also laid down new requirements for the information security and disruption tolerance and prevention related to user-to-network and network-to-network interfaces.

Requirements from Regulation 13 were moved to the regulation's new section 4, concerning IP network-to-network interfaces. The goal of this amendment was to extend the application of the requirements for IP address hygiene/control to other services as well as the internet access service.

Section 9 included an exception for corporate subscriptions, according to which a telecommunications operator can use, under certain conditions, a number received from a corporate subscription and not belonging to its own number space as the calling party number. The telecommunications operator must also ensure the reliability of charging in this event.

The requirements regarding the conveyance of a calling party number with international connections, provided in the previous regulation version (FICORA 49 D/2010 M, section 5), was omitted from the regulation.

The requirements regarding the attachment of identifiers to a calling party number, provided in the previous regulation version (FICORA 49 D/2010 M, section 6), were omitted from the regulation. These were replaced with a new requirement stating that a calling party number must be conveyed to the called subscriber in a format that enables call-backs and the receipt of messages.

The requirements laid down in section 8 of Regulation 28 G/2010 M regarding the music played alongside the call tone were also simplified. According to the new regulation, the service user was no longer required to specify the subscribers to whom music is played. Similarly, the requirement for telecommunications operators to ensure that users are aware of the existence of the service was omitted.

A new requirement was added to section 10 of the regulation; according to this requirement, calling line identification must be indicated as restricted for calls from premium rate service numbers belonging to service groups II to IV.

Additionally, the requirements regarding the handling of a connected subscription's number, provided in the previous regulation version (FICORA 49 D/2010 M, sections 7 and 8), were omitted from the regulation. This requirement was omitted since the service in question is not in use.

Detailed rationale and guidelines for application
Chapter 1 General provisions

1. Scope of application

The Regulation applies to public communications networks and services. Apart from chapter 2, the Regulation also applies to public authority networks. Chapters 3 and 4 of the Regulation apply to communications services provided in the telephone network. According to section 3, paragraph 43 of the Act on Electronic Communications Services, a public communications network means a communications network used to provide communications services to a set of users that is not subject to any prior restriction.

Chapter 2 of the Regulation contains provisions on the documentation of interface descriptions concerning public communications networks and the services provided therein. These general requirements are applied in a technology-neutral manner to all public communications networks and communications services.

Chapter 3 of the Regulation includes provisions concerning various factors related to call set-up control and maintenance and the related announcements and tones provided for the user.

Chapter 4 of the Regulation includes provisions on the use of Finnish numbers as the calling party number, on the transmission and display of a number during a connection and on measures to ensure the validity of the calling party number and the redirecting number.

The provisions of chapters 3 and 4 only apply to communications service provided in a telephone network, as defined in section 2.1.4 of the Regulation. The scope of application of chapters 3 and 4 also covers one-way voice services and messages transmitted over the telephone network (including text messages and faxes). Other identifiers can also be used in the terminal and network when calling and connecting calls; the regulation applies if an E.164 number [6] is used for user or service identification in the network alongside other identifiers.

Therefore, the requirements in chapters 3 and 4 do not, at present, apply to communications services using only name-format addresses that fall outside the scope of application described in the preceding paragraph. The requirements concerning the transfer and validity of subscription numbers laid down in chapter 4 do not apply to such name-format addresses even if it is also possible to use the subscription to make and receive calls using an E.164 number [6]. It should be noted that this limitation to the Regulation's scope of application only applies to the detailed requirements in the Regulation and does not restrict the scope of application of the requirements included in the Act on Electronic Communications Services [1] with regard to provisions concerning the accuracy of charges, for instance.

When it comes to communications networks incorporated as a part of a public communications network or connected to a public communications network, their interconnection, interoperability and signalling in relation to the public communications network are not mentioned in the Regulation's scope of application.

Networks connected to a public communications network refer to customers' own communications networks such as buildings' internal networks and companies' own exchange and telecommunications networks. The requirements concerning networks connected to a public communications networks are included in the requirements concerning user-to-network interfaces in a public communications network.

The Regulation addresses interconnection in the technical sense, meaning the requirements apply to the interconnection of communications networks and services irrespective of the judicial background of the connection.

2. Definitions

This section discusses in detail the definitions used in the Regulation.

2.1. User-to-network interface

In this Regulation, user-to-network interface (UNI) refers to an interface through which the communications network, terminal or application of a customer of a telecommunications operator is connected to a public communications network. In the Finnish Transport and Communications Agency's other texts, this interface may also be referred to as a customer interface.

2.2. Network-to-network interface

In this Regulation, network-to-network interface (NNI) means an interface for interconnection between telecommunications operators' communications networks or

services. In the Finnish Transport and Communications Agency's other texts, this interface may also be referred to as an interconnection interface.

2.3. Public telephone network

This Regulation uses the same definition of 'public telephone network' as other regulations issued by the Finnish Transport and Communications Agency. Public telephone network means a mobile network or a fixed telephone network intended for a set of users that is not subject to any prior restriction and in which the numbering in accordance with Recommendation E.164 [6] of the International Telecommunication Union (ITU) is used.

2.4. Public authority network

This Regulation uses the same definition of 'public authority network' as is given in section 3, paragraph 39a of the Act on Electronic Communications Services: public authority network means a communications network built for the needs of government measures and state security, military defence, public order and security, border control, emergency operations, maritime search and rescue operations, emergency response centre activities, immigration, social and health care emergency services, rail transport security or civil defence.

2.5. Communications service

This Regulation uses the same definition of 'communications service' as is given in section 3, paragraph 37 of the Act on Electronic Communications Services: communications service means a service consisting wholly or mainly of the conveyance of communications in a communications network, a transmission and broadcasting service in a mass communications network, as well as an interpersonal communications service.

2.6. Communications service provided in a telephone network

In this Regulation, a communications service provided in a telephone network means a communications service that enables a user to make and receive calls or send and receive messages by using a number or numbers in a national or international numbering plan. What is essential in this definition is that it refers to a connection made or routed using an E.164 number [6] or a number defined by a national authority, such as a short message service number. Therefore, the definition also covers one-way voice services as well as fax and text message services.

The definition is worded to avoid contradictions or overlap with the definitions and terms used in the law and directives. That is why this Regulation does not make reference to the term 'public telephone service', which is defined in section 3, paragraph 42 of the Act on Electronic Communications Services to mean a communications service used to make and receive national and international calls using a number in a national or international numbering plan. The definition used in this Regulation also covers VoIP services that are one-way with regard to numbering.

2.7. Communications network or service component

In this Regulation, a communications network or service component means a network element, device or information system which constitutes or is utilised by a communications network or service. Communications network or service components include mobile switching centres, base station controllers, base stations, text message centres, DSLAMs, name servers, network access control servers, switches, routers, SIP application servers and intelligent network components. A communications network or service component does not mean transmission links or parts of devices or network elements, such as processor units of a mobile switching centre.

2.8. Finnish telephone number

In this Regulation, a Finnish telephone number means numbering under the Finnish country code 358 in accordance with Recommendation E.164 of the International Telecommunication Union (ITU).

Carrier access codes, emergency numbers and national numbers beginning with 11 (e.g. numbers that begin with 118 and 116) are not E.164 numbers. The use of these numbers as the calling party number or redirecting number is nonetheless not allowed.

2.9.Calling party number

In this Regulation, calling party number means the number of the subscription from which a call or message originates. In message traffic, alphanumeric data containing both numbers and letters can appear as the calling party number instead of a number.

In ISUP standards, this parameter is also called "calling party number". In the SIP protocol, calling party number means the number transmitted in the header field P-Asserted-Identity (PAID) but, from the viewpoint of verifying the validity of a number, also the number transmitted in the header field From.

2.10. Redirecting number

In this Regulation, redirecting number means the number from which a call is diverted.

In ISUP standards, this parameter is also called "redirecting number". In the SIP protocol, the header field used to transmit the redirecting number may vary depending on what has been agreed on regarding interconnection (typically Diversion, History-Info).

2.11.Called party number

In this Regulation, called party number means the number of the subscription receiving a call or message.

In the SIP protocol, called party number means the number transmitted in the header field Request-URI.

2.12. Public international interface

In this Regulation, public international interface means an international interconnection interface through which a telecommunications operator receives terminating interconnection traffic from different originating networks without being able to identify the calling party subscription or the originating network.

In the case of text messages, a public international interface refers to a signalling interface or API, if traffic coming from abroad is transmitted through it to the subscribers of the Finnish mobile network without a possibility of identifying the sender (e.g. SMS hub).

2.13. Premium rate service number

Premium rate service numbers mean numbers that can be used to provide services charged by means of the telephone bill. In accordance with the Finnish Transport and Communications Agency's Regulation 35 [7], premium rate service numbers are grouped into service groups I to IV (non-profit services, consulting and ordering, entertainment services and adult entertainment services). Annexes 1 and 2 to the Regulation [7] define how service number are categorised in the service groups.

2.14. Protected SMS Sender ID

A protected SMS Sender ID refers to the SMS Sender IDs registered by the Finnish Transport and Communications Agency with a registration decision. An SMS Sender ID is an alphanumeric sender identifier that is in maximum 11 characters long and must follow the 3GPP specification TS23.038 (GSM 7 bit default alphabet) [8]. In some cases, the protocol of the application interface of the Short Message Service Centre supports a character set that is narrower than the standard, and when used internationally, it is recommended that SMS Sender ID only contains the following characters: 0–9, a–z, A–Z and space. A separate guide maintained by Traficom [9] provides more detailed information about the SMS Sender IDs and their registration.

By registering SMS Sender IDs they use with Traficom, the parties that send text messages can protect their SMS Sender IDs and ensure that no other party can use the same SMS Sender IDs. After Traficom has registered the SMS Sender ID to be protected with a registration decision, a transition period of 3 months begins. After the transition period, the SMS Sender ID can only be used by the party that registered it. Text messages sent by any other parties using the protected SMS Sender ID will not be distributed in Finland.

In connection with the registration of an SMS Sender ID, Traficom issues an SMS number beginning with 19 to the applicant, which can be used for traffic control and identification in the operator interface, if necessary. The SMS number is not visible to end users, and it must not be published.

An SMS service provider seeking protection can apply for the registration of an SMS Sender ID and the right to use an SMS number by filling out the application form available on Traficom's website https://www.traficom.fi/en/applying-short-message-service-sms-sender-id.

2.15.Corporate subscriber

This Regulation complies with the definition of 'corporate subscriber' laid down in section 3, paragraph 41 of the Act on Electronic Communications Services. According to the Act, corporate subscriber means an undertaking or an organisation which subscribes to a communications service or a value-added service and which processes users' confidential communications, traffic data or location data in its communications network.

Chapter 2 General documentation requirements

3. Interface descriptions of communications networks and services

This section contains provisions on documentation requirements concerning user and network-to-network interfaces applicable to all public communications networks and services.

The requirements laid down in this section are general obligations, the content of which will be further illuminated with examples later in this chapter.

3.1. Interface descriptions: Network-to-network interface (NNI)

According to the Regulation, telecommunications operators must define interface descriptions according to which another telecommunications operator can connect its communications network or service to their networks and ensure interoperability of services.

In order to provide end-to-end communications services, it is necessary for telecommunications operators to interconnect their public communications networks and services.

Interconnection and granting of access rights between telecommunications operators are partially regulated by the Act on Electronic Communications Services and the SMP decisions issued under it, while also being partially based on commercial contracts in which measures may be subject to a charge or free of charge, especially with regard to IP interconnections. Provisions on obligations concerning interconnection between telecommunications operators are laid down in sections 60 to 66 of the Act on Electronic Communications Services. This Regulation does not even indirectly comment on what type of interconnection obligations result from the legislation.

The objective of this Regulation is to promote the technical implementation of interconnections, particularly in circumstances in which there are no established technical solutions and interconnection requires that the telecommunications operators select options enabling interconnectivity between their networks and services among the alternatives defined in the standards.

The definition of interface descriptions promotes practical interconnections between telecommunications operators, regardless of whether it is based on obligation or free will.

Application

An interface or service description is a telecommunications operator's description of how a telecommunications operator requesting interconnection can connect to its network. Telecommunications operators must define the aforementioned interface description at a level of specificity that enables technical implementation of interconnection on the basis of that interface description. Additional details depend on the services to be interconnected and the interconnection technology used. Therefore, the Finnish Transport and Communications Agency has deemed it appropriate to leave this matter to be decided by the telecommunications operators themselves. Below are a few examples of interconnection cases and the minimum content of the interface descriptions appropriate to them:

- **Bitstream**: A network operator should determine in the interface description the technology, physical implementation of the interconnection and the available speed classes for both the user-to-network and network-to-network interfaces. Moreover, the interface description should indicate any possible restrictions concerning subscription use (e.g. the number of MAC addresses) and any other appropriate specifics related to the relevant technology dependent on the implementation such as the field used for customer identification (DHCP option 82) and any possible information related to the compatibility of customer terminals.

- **Internet access service (IP transit and peering)**: Insofar as the internet access service is concerned, the interface description should determine, for instance, the used network technology, physical implementation of the interconnection, available speed classes and supported IP and routing protocols for the network-to-network interface. In addition to these, the interface description should determine any other possible requirements, restrictions and other relevant details (e.g. AS number) defined for interconnections.

- **VoIP network-to-network interface**: This example looks at a case in which the SIP protocol has been selected for interconnecting telephone services. In this event, at least the following should be determined in the interface description: the network technology implementation of the interconnection (e.g. interconnection over a separate IP connection, traffic exchange point, or the internet), including more detailed technological specifications (see e.g. the previous example), and the employed application protocol (SIP), along with the specifications required for interconnectivity and interoperability (SIP profile). Moreover, the interface description should determine the other requirements or restrictions possibly determined for interconnections.

In addition to the aforementioned details, the interface description should indicate the availability of the product as well as the applied delivery, fault recovery, maintenance and monitoring procedures, including the service level classes available to the telecommunications operator requesting interconnection.

If some centralised service (e.g. FICIX, www.ficix.fi) is used for interconnection instead of a direct interconnection between two parties, this should be mentioned in the interface description. The requirements or guidelines possibly determined by the centralised service do not, however, have to be reiterated in the description.

Recommendation

The Finnish Transport and Communications Agency recommends that telecommunications operators publish the interface descriptions on their websites, for instance, so as to make them available to telecommunications operators requesting interconnection.

3.2. Interface descriptions: User-to-network interface (UNI)

According to the Regulation, telecommunications operators must define interface descriptions according to which users can connect their terminals to networks and use the provided communications services. The interface description must comprise all the technical characteristics that affect with which terminal equipment or software the communications service can be used.

The aim has been to make the definition also applicable to communications services used over an IP network, such as email and VoIP services, and to ensure that telecommunications operators are able to tell their customers the requirements that terminals and software must meet for the service to function in the way intended by the telecommunications operator. Another objective of the requirement is to better enable users to use the service with the terminal and/or software of their choice.

Application

In practice, it is often sufficient that telecommunications operators determine the standard or specification with which the interface complies. If the standard in question allows for different and incompatible implementations, the description should include a more detailed specification.

Telecommunications operators only need to document the interface as regards features relevant for selecting terminals and software compatible with the communications service provided. For example, in relation to mobile network subscriptions, the description should indicate the services, network technologies and frequency bands supported. Telecommunications operators do not need to list various 3GPP standards in the description.

Publication of interface descriptions

The requirement is also related to the obligation laid down in section 243, subsection 5 of the Act on Electronic Communications Services [1] requiring telecommunications operators to publish specifications on interfaces to which telecommunications terminal equipment may be connected. This publication requirement only concerns telecommunications terminal equipment, but the Finnish Transport and Communications Agency recommends that telecommunications operators also publish those technical requirements for other terminals and software that enable the terminals and software to be connected to their networks and use their communications services.

3.3. Recommendations for the interoperability of communications networks and services

References to key national recommendations concerning the interoperability of communications networks and services are assembled under this section. The requirements and recommendations related to the interconnectivity of telephone services are detailed in section 8.2 of these notes. Chapter 6 includes recommendations for the implementation of SIP services.

Recommendations concerning Ethernet-based rental products and their implementation have been published in FICORA's working group report 3/2010 on Ethernet-based rental products [10]. The report includes recommendations for the implementation of bitstream and Metro-Ethernet products.

Recommendations concerning broadband connections' order and delivery processes have been published in FICORA's working group report 3/2006 on practices between operators in processes for broadband connections [11].

Chapter 3 Special requirements for communications services provided in a telephone network

4. Signalling

This section determines the requirements for signalling in communications services provided in a telephone network.

4.1. Transfer of information required by the obligatory functions in the network-to-network interface

Under the Regulation, the interconnection traffic between telecommunications operators must be arranged so that the information required by functions that are stated as obligatory in legislation is transferred over the connection interface.

The statutes lay down certain requirements for telecommunications operator functions whose appropriate implementation requires information to be transferred over the network-to-network interface. A list of the relevant provisions is included in chapter 2 "Other related regulations and statutes of these notes.

Some of the functions may also be implemented in a manner that does not require information to be transferred over the interface. In that event, this requirement will not apply.

The functions covered by the Regulation include, for example, the following:

- charging and the related call itemisation in customer invoicing (if the telecommunications operators have agreed to use a charging method in which charging information is transferred over the network-to-network interface);

- functions related to the calling party's number information, including charging on the basis of the calling party's number, tracing of malicious calls, and positioning of caller and address search at emergency response centres.

This is a general requirement that requires adequate information transfer over the network-to-network interface, regardless of interface implementation.

Application

In interconnection traffic negotiations, telecommunications operators must ensure that all the relevant information will be transferred over the adopted protocols determined by the telecommunications operators.

Presently, interconnection is primarily based on the ISUP user part of common channel signalling, determined with regard to basic calls in the standards SFS 5779 (ISUP2) [12] and SFS 5869 (ISUP3) [13], and with regard to supplementary services in the standards SFS 5778 [14] and SFS 5868 [15].

Some of the information transferred over the network-to-network interface is included in the various prefixes of the number transferred in the called party's number field. With regard to these, the codes are determined in the FICORA working group report 5/2004 on number portability, fixed telephone network, technical network implementation [16].

If telecommunications operators implement and start to use other signalling methods (e.g. SIP) at the network-to-network interface, they must ensure that the information required by the obligatory functions can be transferred over the interface.

4.2. Signalling point codes used in Finland

According to the Regulation, communications network components that are located in Finland and are connected to a public telephone network by using common channel signalling system must only apply the signalling point codes granted by the Finnish Transport and Communications Agency.

In the common channel signalling system, signalling point codes are used for identifying communications network components connected to the signalling network. By only using codes granted by the Finnish Transport and Communications Agency in components connected to the public network it can be ensured that no two components have the same code and that signalling traffic to and from each component can be correctly channelled in the signalling network.

Application

The principles for granting signalling point codes are determined in the Finnish Transport and Communications Agency's Regulation 32 on numbering in a public telephone network [17].

Finland's national common channel signalling network forms a single unified network, in which only codes allocated to the national network are used in the network indicator field of the signalling part MTP. This code, determined in section 14.2.2. of ITU-T recommendation Q.704 [18], is "Sub-service field Network indicator code 10 National network".

The structure of the international signalling point codes used in the international signalling network is determined in the ITU-T recommendation Q.708 [19].

5. Timers

This section determines the requirements for timers in communications services provided in a telephone network.

5.1. Call set-up timers

Under the Regulation, telecommunications operators must implement, in an appropriate manner, the timers necessary for call set-up.

Call set-up signalling reserves various resources in the network during call set-up. In circuit-switched networks the prevention of overlong resource reservations aids in network resource (e.g. voice channels) dimensioning, while preventing the likelihood of call barring. Overlong (non-disconnected) call attempts cause problems in VoIP networks too, if the memory reserved for maintenance of connection status is exceeded. Insofar as these are concerned, the timers must be short enough.

From the user's perspective, it is essential that sufficient time has been reserved for call set-up so that call set-up is not unnecessarily prevented due to exceedingly short timers. Since the executor of the shortest timer in the call set-up chain determines the time reserved for call set-up, it is reasonable to determine minimum lengths for the timers.

Application

Standard-compliant timers are implemented in the network components participating in call set-up, and these prevent resources from staying reserved in various cases of call-set up failure, while also preventing overly rapid call set-up interruption.

Necessary timers include at least the timer controlling the connection time and the timer controlling the called party's response time. The timer controlling the connection time in circuit-switched networks' ISUP signalling (T7) is 20 to 30 seconds (nominal value 30 seconds) and the timer controlling the called party's response time (T9) is 1.5 to 3 minutes (nominal value 3 minutes). Similar timers' nominal values, observing their ranges, should also be used in other networks.

As regards calls terminating in the mobile network, the timer controlling the called party's response time can, however, be set shorter than the determined minimum value. However, in this event it must be ensured that the timer is long enough to prevent the operation of any service from being blocked due to an overly short timer (e.g. a call does not have the time to be forwarded to voice mail if the timer is too short).

The SIP protocol does not determine timers that are fully compatible with the aforementioned timers. In VoIP solutions utilising the SIP protocol, it is, however, possible to replace the timer controlling the connection time and the timer controlling the called party's response time with SIP protocol timer C (Proxy INVITE transaction timeout) [20].

In adaptation situations, such as cases in which a VoIP service implemented using the SIP protocol is interconnected to a circuit-switched telephone network, each network operates in accordance with its own timers.

Signalling standards and specifications also specify other timers. Some of these are related to resource management and some are necessary with regard to the

functionality of signalling. Telecommunications operators must implement the timers necessary for the provided service.

5.2. Timers for calls placed to premium rate service numbers

Under the Regulation, in communications services provided in a telephone network, the telecommunications operator that implements the service must be prepared to implement timers for monitoring conversation time in calls made to premium rate service numbers.

The Regulation requires telecommunications operator that provides the service provider with a connection to the public telephone network (telecommunications operator implementing the service) to be able to technically implement timers, but does not determine their length or when timers should be used. Functions and services related to the management of the user's call costs concerning call duration fall within the scope of self-regulation.

This matter is discussed in more detail in the Basic Set of Norms for Providing Premium Telephone Services that can be found on the website of MAPEL, the Ethical Committee for Premium Rate Services (www.mapel.fi) [21]. Section 24 of the set of norms, based on the sector's self-regulation, determines that the longest allowed call duration in the service groups III and IV of premium rate service numbers is 30 minutes, unless the service is continued by an active proceeding by the user.

Application

A timer is activated in communications networks upon activation of the answer signal when calling specifically determined service numbers. Expiry of the timer disconnects the call.

6. Tones, announcements and ringing signals

6.1. Tones, announcements and ringing signals used in telephone services

Under the Regulation, tones, announcements and ringing signals complying with standards SFS 5876 [22] and SFS 5749 [23] must be used in communications services provided in a telephone network in order to advise the user on different network modes related to call set-up.

Providing advice for users regarding communications networks' various modes is beneficial for the network and user alike. When the user is informed about the reason blocking call set-up, they can alter their course of action at the call attempt, for instance. For example, if they hear the announcement "the number you have dialled is not in service", they can check the number dialled. It is crucial to users that the tones and announcements regarding network modes are consistent in as many situations as possible. It is also beneficial to the network that users do not burden the network with repeated erroneous call attempts.

Application

The standard SFS 5876 [22] determines a set of situations and the tones to be used in them; similarly, SFS 5749 [23] determines a set of situations along with the announcements to be used in them. Telecommunications operators must use the specified tones and announcements in the situations determined in the standards. The standard SFS 5749 also explains the general principles of using tones and announcements. The standard SFS 5749 does not include the mapping of SIP responses to ISUP cause codes. Insofar as these are concerned, mapping is determined in the FICORA recommendation 201/2014 S [24], based on the ITU-T Recommendation Q.1912.5 [25]. Recommendation Q.1912.5 determines the various

SIP profiles (A, B and C) and the relevant mapping of cause codes. IETF has determined similar mappings in specification RFC 3398 [26].

The various ringing signals are determined in the standard SFS 5876 [22]. Insofar as mobile subscriptions and VoIP subscriptions are concerned, information of incoming calls is transferred to the terminal in signalling, and the terminal indicates incoming calls on the basis of this information. The terminal can indicate incoming calls in a number of ways, and the Regulation does not impose any requirements on terminal operation.

6.2. Other tones and announcements used in telephone services

Under the Regulation, any other signals and announcements than those related to call set-up in accordance with subsection 1 must also be unambiguous, clear and distinguishable from one another.

For instance, a telecommunications operator may deem it necessary to adopt a tone or announcement that is not determined in the standards in connection with the introduction of new services. In order to prevent these tones and announcements from being mistaken for standard-compliant tones and announcements or others adopted by the telecommunications operator, they must be unambiguous, clear and distinguishable from one another.

Application

When a telecommunications operator adopts a new tone or announcement that is not included in the standards, it must ensure, using such measures as user tests, that it will not be mistaken for other tones and announcements already in use.

6.3. Use of music and similar alongside ringing tone

Under the Regulation, telecommunications operators can offer their subscribers a service where, when calling to a number subscribing to the service, the calling party hears, in addition to the standard-compliant ringing tone, music or something similar selected by the subscriber of the service. The standard-compliant ringing tone must be clearly heard alongside other sounds.

Music or similar sounds can be offered to replace a ringing tone if it does not cause problems to users. Users must have a clear understanding that they hear a ringing tone related specifically to the service and not, for instance, call queuing music. If ringing tones were only music, it would be impossible to differentiate between ringing tones and call queuing music.

Application

A ringing tone complying with the standard SFS 5876 [22], at the volume determined in the standard, must be used alongside music or similar sounds. The music must be adjusted to a volume ensuring that the standard-compliant ringing tone is clearly audible.

Such things as birdsong and a train whistle, for instance, also count as music and similar sounds. However, marketing content, for example, is not allowed.

Chapter 4 The use, transfer and validity of subscription numbers

7. The use of Finnish numbers as the calling party number

According to the Regulation, the geographical area of use of Finnish telephone numbers is Finland. The use of Finnish telephone numbers as calling party numbers and redirecting numbers abroad is forbidden.

As a rule, numbers, codes and prefixes granted in accordance with numbering decisions are intended for the provision of services within the territory of Finland. Nonetheless, terminating traffic from abroad includes a significant number of calls in which the calling party number is a Finnish telephone number. These calls may include genuine calls in which the caller has the right to use the number in question, but in most cases the numbers can be assumed to be spoofed and their use unauthorised.

Caller ID spoofing or spoofing a calling party number means disguising the number where the call originates as a Finnish number. This technique is widely used by criminals to increase the likelihood of victims answering international scam calls. The Finnish National Bureau of Investigation has reported receiving numerous reports about scam calls like the above in 2020 and 2021. In the cases reported, caller ID spoofing to disguise the calling party number as a Finnish one has been a key element of the scam.

Measures to address the problem have been discussed by the Finnish Transport and Communications Agency's recommendation working group. The group prepared a recommendation to telecommunications operators on detecting and preventing caller ID spoofing [4]. One of its key proposals is forbidding the use of Finnish telephone numbers as calling party numbers and redirecting numbers abroad by way of a regulation issued by the Finnish Transport and Communications Agency.

Application

The use of Finnish telephone numbers as calling party numbers and redirecting numbers abroad is forbidden. However, according to the Regulation, the use of Finnish telephone numbers is allowed in the following two cases:

1) from mobile network subscriptions while roaming abroad when the subscription has a Finnish mobile network subscriber number or a subscriber number that begins with 0299, or

2) when traffic is directed to Finland so that the subscriber using a Finnish telephone number can be identified and the subscriber's right to use the telephone number can be verified in accordance with sections 10.1 and 10.2 of the Regulation.

In roaming, the primary area of use of the number is Finland, and the intention is to allow users to make calls with their own mobile numbers also when travelling abroad. It should be noted that the exception only concerns subscriber numbers in mobile networks and subscriber numbers that begin with 0299. Therefore, the use of nationwide subscriber numbers, for example, is not allowed while roaming abroad.

Under the Regulation, the use of Finnish telephone numbers is also allowed when traffic is directed to Finland so that the subscriber using a Finnish telephone number can be identified and the subscriber's right to use the telephone number can be

verified in accordance with sections 10.1 and 10.2 of the Regulation. In this context, it is irrelevant whether the customer is physically located in Finland or abroad. The originating telecommunications operator can identify the customer and validate the number in both cases, and there is no need to apply the prohibition.

Thus, for example, corporate switchboards and call centres may be physically located abroad and still use Finnish telephone numbers as long as the traffic is directed to Finland via a dedicated traffic route so that a customer or telecommunications operator using Finnish numbers can be identified and the telecommunications operator of the originating network can comply with Regulation 28.

8. Transfer of subscription numbers

8.1. Transferring a subscription number at the network-to-network interface

Under the Regulation, the calling party number and, in the case of call forwarding, the redirecting number must be transferred between telecommunications operators in communications services provided in a telephone network.

Moreover, section 8.2 of the Regulation states that the calling party number and, in the case of call forwarding, the redirecting number must be transferred in an international format at the network-to-network interface, unless the signalling can indicate whether the format of the number is a national (significant) number or an international number.

Calling party numbers can be utilised in many communications network services (e.g. number display, charging) and many official functions are based on it (e.g. address search and positioning at emergency response centres in connection with emergency calls). In the case of call forwarding, the transferred subscription number can be used for charging, for instance. Due to this, it must be required that the numbers are transferred between telecommunications operators, in which case they can be further transferred to the application using them. The transferred number should be as unambiguous as possible.

The ISUP standards define the method for transferring the calling party number and, in the case of call forwarding, the redirecting number. Subscription numbers can be transferred in their national or international formats, depending on the case.

The SIP protocol provides numerous alternative header fields for number information transfer, and the number can be displayed in different formats in the fields. Different parties may interpret the standards in a different fashion, in which event the recipient of number information may find it difficult to interpret in which header and format the information required for call transfer is presented.

Application

Telecommunications operators must transfer the calling party number and, in the case of call forwarding, the redirecting number in the telephone network, if these are available. Both numbers are, however, not always available in incoming calls from switchboards or abroad.

When using ISUP-based signalling, the transfer of subscription numbers over the telecommunications operator interface is determined in the ISUP standards **Error! Reference source not found.**…**Error! Reference source not found.**. In accordance with the ISUP standards, the parameter "calling party number" is used and the parameter "redirecting number" is used in connection with call forwarding.

In the SIP protocol, calling party number means the number transmitted in the header field P-Asserted-Identity (PAID) but, from the viewpoint of verifying the validity of a number, also the number transmitted in the header field From. In the SIP protocol, the header field used to transmit the redirecting number may vary depending on what has been agreed on regarding interconnection (typically Diversion, History-Info). With regard to the SIP protocol, this matter is discussed in more detail below in section 8.2.

The calling party number and, in the case of call forwarding, the redirecting number must be transferred in an international format at the network-to-network interface, unless the signalling can indicate whether the format of the number is a national (significant) number or an international number.

In order to ensure the validity and unambiguity of a number, telecommunications operators must agree on the other details of subscription number transfer.

8.2. Recommendations for the transfer of subscription numbers in the SIP protocol

With regard to VoIP interconnection, the transfer of subscription numbers, and by extension caller identities, is not unambiguously determined in the standards. The matter is discussed in the FICORA Recommendation 201/2014 S [24]. The purpose of the recommendation is to provide telecommunications operators with a default value that should be followed, unless expressly otherwise agreed by telecommunications operators.

The recommendation defines, for example, the transfer of calling party numbers, redirecting numbers and called party numbers and the related fields and parameters including the formation of a routing number. The recommendation also covers the transfer of calling line identification restrictions at the interface for interconnection traffic.

8.3. Changing a subscription number

According to the Regulation, the calling party number and the redirecting number must not, in principle, be changed when being transferred via the communications network.

The validity of the calling party number and the redirecting number requires that the number must not be changed when being transferred via the communications network in signalling, excluding separately determined situations.

Application

In signalling, as a rule, the content of the calling party number field and the redirecting number field is not changed in network components. Exceptions include the transfer of the calling party number to the customer subscription, in which case it can be altered in accordance with section 9.1 of the Regulation, as well as various intelligent network solutions, including number portability, in which the directory number serves as the subscriber identifier, instead of the actual routing number that identifies the technical subscription. In some cases of adaptation, a number format conversion between international and national significant numbers can be performed in the network. Moreover, the calling party number can be changed to another number controlled by a given telecommunications operator and agreed with the customer in various types of number changing services and, for instance, the multi-SIM service.

When the calling party number of a text message coming from the public international interface is an SMS number, the telecommunications operator must

change it to "Tuntematon" (Unknown) in the alphanumeric format in accordance with section 10.7 of the Regulation.

9. Transfer of a calling party number at the user-to-network interface

9.1. Transfer of a calling party number in a format enabling call-back

According to the Regulation, in call services, calling party numbers must be transferred to the called party in a format that enables call-back.

The basic idea of the CLIP supplementary service (calling line identification presentation), provided for called parties is for the called party to be directly able to see the number in a manner enabling call-back.

Application

The number transferred at the user-to-network interface may be different, depending on the call type and network. It may be possible to transfer the calling party number in the national or international format, with either the 00 or + prefix used for indicating the international format. In a SIP-based network it may be possible to transfer even name-format SIP addresses, provided that they enable call-back or a response message to be sent.

There are therefore various options, and their usefulness is largely dependent on the used network solution and terminals' ability to handle addresses in various formats. Because of this, telecommunications operators have been given the opportunity to decide on the specific calling party transfer format, as long as this requirement is fulfilled.

9.2. Procedures in the case of premium rate service numbers

In the early 2000s, FICORA discovered cases in which premium rate service numbers belonging to service groups II to IV were used as calling party numbers for advertising purposes. Customers had been called by means of, presumably, automatic calling systems in such a manner that the service numbers had been registered in the memory of the called party telephones. This was done to lure called parties to call back to premium rate service numbers without them having ordered a service themselves.

The aforementioned cases of misuse have not been seen with premium rate service numbers belonging to service group I. Services, the nature of which would require the display of premium rate service numbers to called parties, do not exist in service groups II to IV.

Service number holders have considered it important that subscription numbers corresponding to service numbers are not revealed to users. Subscription numbers could be used to call service numbers without the service fee associated with the service number. Due to this, service providers should have the opportunity to decide whether to restrict the presentation when using a subscription number.

Application

In the case of calls originating from premium rate service numbers in service groups II to IV, the originating telecommunications operator may set either the subscription number or service number of the subscription in question as the calling party number. In the case of service numbers, the number presentation is always indicated as restricted, and in the case of subscription numbers, the number presentation is indicated as restricted when the service provider so wishes.

10. Validity of a subscription number

10.1. Ensuring the validity of a number

According to the Regulation, the telecommunications operator of the call originating network must ensure that the calling party number it transfers in call origination and, in the case of call forwarding, the redirecting number is valid and unambiguous.

This obligation is further specified in the second subsection as follows: If the telecommunications operator of the call originating network uses in call origination a number that it does not administrate as the calling party number, it must ensure that the subscriber has an unambiguous right to use the number. However, even in this case, the telecommunications operator must ensure the reliability of charging.

As a rule, telecommunications operators must ensure the validity of numbers received from the user-to-network interface. The parallel use of numbers requires caution and careful consideration because it involves the risk that the number is not or will cease to be assigned to the subscriber. This may result in a situation where the wrong party is charged for the call or the service used via the call.

Because of the numerous applications of the calling party number and, in the case of call forwarding, the redirecting number, it is reasonable to require the number that is transferred over the telecommunications operator interface to be valid and unambiguous. In some cases, the valid number associated with charging and with call-back is different. In these cases, as a rule, the number to be transferred should be the one that is valid with regard to charging.

Multinational companies, in particular, have cross-border VoIP networks in which they wish to route calls to the public telephone network via a corporate subscription in the correct target country’s public telephone network. Their goal may be, for instance, to save on international call costs, while also enabling call-back directly to the mobile phone instead of the PBX. Calls made from international numbers and domestic mobile phone numbers connected to a PBX may be directed from the corporate subscription to the public telephone network.

Regularly blocking number presentation or altering the calling party number into the PBX’s call number would, however, contradict the user's interests, so the Regulation is based on the presumption that a telecommunications operator may use a calling party number it has received from a subscription in an unchanged form as a calling party number, if this number can be unambiguously connected to a certain subscription. The telecommunications operator’s various options for verifying the reliability of charging are discussed in the application instructions.

Application

The use of numbers other than those administered by a telecommunications operator requires an agreement with the subscriber. The telecommunications operator can verify the subscriber’s right to use the number in question from the telecommunications operator administering the number, unless the matter can be reliably verified from directory information or an agreement and invoice presented by the subscriber.

A telecommunications operator receiving a number from another telecommunications operator cannot verify the validity of that number. Therefore, in practice, the Regulation requires a telecommunications operator administering a subscription to set the calling party number or redirecting number to signalling in outgoing calls and messages from the subscription, while also being responsible for the validity of the

number. The telecommunications operator administering a redirecting number is responsible for the validity of the redirecting number.

If a telecommunications operator uses in call origination a calling party number it has received from a subscription and that number does not belong to the operator's number space, the telecommunications operator must ensure with the subscriber customer or the telecommunications operator who administers the number that the number can unambiguously be associated with a certain subscription of the subscriber in question.

If the telecommunications operator cannot guarantee the validity of the calling party number received from a subscription, it must employ other methods to ensure that a calling party number that cannot potentially be billed or is otherwise erroneous does not endanger the reliability of charging. Telecommunications operators may ensure the reliability of charging by, for instance:

- indicating the calling line identification as restricted;
- replacing the calling party number with the identifying number of the subscription in question (switch call number in the case of PBXs);
- indicating that the call is diverted and indicating the identifying number of the subscription in question as the redirecting number (switch call number in the case of PBXs);
- indicating the call payer in some other manner (e.g. using the P-Charge-Info field determined in the SIP protocol [27]).

In the case of calls diverted by a PBX, the PBX should transfer both the original calling party number and the switch number as the redirecting number. If the PBX is unable to transfer both numbers, it should only transfer the switch number. If, however, the PBX is able to signal that the call is being forwarded, it can transfer the original calling party number as well.

10.2. Procedures when receiving incorrect numbers from the customer interface

According to the section 10.3 of the Regulation, if the calling party numbers received by the telecommunications operator are regularly incorrect, the telecommunications operator must, in call origination, restrict calling line identification in the outgoing signalling irrespective of the indicator value for identification restriction it has received. In similar situations concerning text message, multimedia message and RCS message services, the telecommunications operator of the originating network must change the calling party number into such a number to which calls cannot be returned and reply messages cannot be sent.

Because of the numerous applications of the calling party number and, in the case of call forwarding, the redirecting number, it is reasonable to require the number that is transferred over the telecommunications operator interface to be valid and unambiguous.

Application

When the calling party numbers received by the telecommunications operator are regularly incorrect, the telecommunications operator must restrict calling line identification in the signalling. If the telecommunications operator receives incorrect numbers from a shared PBX, the telecommunications operator may need to block the call attempt instead of simply indicating the calling line identification presentation restricted.

If the presentation is set as restricted, the calling party number is transferred in telecommunications operator networks but the number is not transferred over the user-to-network interface. The only exception to this rule is the authorities receiving emergency calls; calling party numbers are transferred to them despite the value of the restriction indicator.

Calling line identification cannot be indicated as restricted in text message, multimedia message or RCS message services, so the telecommunications operator must change the calling party number into a number to which calls cannot be returned and reply messages cannot be sent. In this case, the Finnish Transport and Communications Agency recommends that telecommunications operators should change the calling party number to the alphanumeric identifier "Tuntematon" (Unknown) so that the practice would correspond to the processing of messages arriving via the public international interface.

10.3. Procedures when receiving incorrect numbers from the public international interface

According to section 10.4 of the Regulation, telecommunications operators must block calls terminating from the public international interface when the calling party number is clearly incorrect or the calling party number is a Finnish telephone number and the situation does not involve roaming as referred to in section 7.2.1.

The purpose of this course of action is to prevent users from becoming victims to international crime (the problem is discussed in more detail in section 7), which is why the calls must be blocked instead of connecting them forward with calling line identification restricted. This stricter rule set for public international interfaces is justified because number spoofing is very rare in national traffic and fraudulent calls are nearly always made from abroad.

It is also worth noting that when a call terminates in Finland through an interconnection interface for international traffic, the receiving telecommunications operator cannot identify the caller or verify whether the caller has the right to use the calling party number indicated. This is why the measures presented in the Regulation are necessary to verify the validity of numbers.

Application: General application guidelines

The Regulation requires telecommunications operators to block calls terminating from a public international interface if the calling party number is clearly incorrect or a Finnish telephone number. Such calls cannot be connected to the called party. Telecommunications operators can implement call blocking by releasing the call or by directing the call attempt to an indication device that transmits ringing tone on the voice channel, for example.

In accordance with section 2.9, in the SIP protocol calling party number means the number transmitted in the header field P-Asserted-Identity (PAID) but, from the viewpoint of verifying the validity of a number, also the number transmitted in the header field From. In this respect, telecommunications operators can perform the validity verification in accordance with the Regulation on both the PAID and From header fields and block the call if at least one of the fields gives reason to do so. Alternatively, telecommunications operators can change the number in the header field From to correspond to the value in the header field PAID and only verify that information.

Clearly incorrect numbers, as referred to in the Regulation, mean numbers that fall outside the scope of Recommendation E.164, such as carrier access codes, emergency numbers and national numbers that begin with 11 (e.g. numbers

beginning with 118 and 116), for example. These numbers are subject to the same filtering measures as Finnish numbers in compliance with the Regulation.

According to section 10.6 of the Regulation, the requirements concerning the verification of the validity of numbers laid down in sections 10.4 and 10.5 do not apply to situations in which the called party number is a Finnish mobile station roaming number (MSRN). The following MSRN number spaces are currently in use: 04099, 0457011, 0457601, 0457605, 0508710, 0508711, 0508712, 0508713, 0508761 and 050879.

Application: Mobile network subscriber numbers or subscriber numbers beginning with 0299

According to the Regulation, telecommunications operators must block calls terminating from the public international interface when the calling party number is a Finnish telephone number and the situation does not involve roaming as referred to in section 7.2.1 of the Regulation.

Thus, calls from mobile network subscriber numbers or subscriber numbers beginning with 0299 do not have to be blocked if the number belongs to a customer of a telecommunications operator with telecommunications operations in Finland and the customer in question is abroad and can therefore be assumed to be making the call. The telecommunications operator receiving traffic at the international interface is responsible for carrying out these verifications, and the operator can connect the call forward only after a successful verification. The telecommunications operator receiving international traffic can also outsource the verifications to another telecommunications operator.

The verifications must be carried out with respect to the telecommunications operator's own numbers, mobile network subscriber numbers of other telecommunications operators and subscriber numbers beginning with 0299. To carry out the verifications, telecommunications operators must agree on how to arrange the required exchange of information between telecommunications operators. This matter and the alternatives available are discussed in more detail in the Finnish Transport and Communications Agency's recommendation to telecommunications operators on detecting and preventing caller ID spoofing [4].

To ensure that any errors and failures in the arrangements in question would not prevent users roaming abroad from calling Finland, telecommunications operators do not have to block calls if the validity of the number cannot be verified because of a temporary error in the verification service.

The verification referred to above is not required for VoLTE roaming (S8HR) calls, because in these calls telecommunications operators can identify users and verify their right to use numbers.

In accordance with section 10.5 of the Regulation, telecommunications operators must, instead of blocking a call, restrict calling line identification in calls in which the calling party number begins with 0435. The calling line identification restriction must be activated regardless of the location of the subscription, meaning that the verification defined below does not have to be carried out for these numbers.

Application: Call forwarding

The blocking procedure described in the Regulation also applies to the termination of forwarded calls from the international interface when the calling party number is a Finnish telephone number. In accordance with section 10.5 of the Regulation, telecommunications operators must, instead of blocking a call, restrict calling line

identification in calls in which the redirecting number is an international telephone number.

According to section 10.4 of the Regulation, forwarded calls can be normally connected to the called party if the situation involves roaming as referred to in section 7.2.1. This means situations in which the redirecting number is a Finnish mobile network subscriber number or a subscriber number beginning with 0299 and the validity of the number has been successfully verified (see details above in section Application: Mobile network subscriber numbers or subscriber numbers beginning with 0299).

As noted in section 2.10, in the SIP protocol, the header field used to transmit the redirecting number may vary depending on what has been agreed on regarding interconnection (typically Diversion, History-Info). Therefore, telecommunications operators must identify in which field the information is transferred and target their measures accordingly. In the same connection, telecommunications operators are recommended to clean the header field Diversion so that it only contains the most recent redirecting number.

Application: Text messages

The telecommunications operator must block any text messages coming from the public international interface to the subscribers of the Finnish mobile network in which the number of the calling party number is a Finnish telephone number.

When the calling party number of a text message coming from the public international interface to the subscribers of the Finnish mobile network is an SMS number in accordance with Annex 2 to the Finnish Transport and Communications Agency Regulation 32 [17], the telecommunications operator must change it to "Tuntematon" (Unknown).

SMS numbers refer to numbers used to direct text, image and multimedia messages to SMS services. SMS numbers are numbers beginning with 1 with at least 5 parts, but they are not numbers in accordance with Recommendation E.164 of the International Telecommunication Union (ITU). The emergency number 112 and the public directory assistance number 118 are also SMS numbers referred to in this Regulation.

The purpose of this course of action is to prevent the subscribers of the Finnish mobile network from becoming victims of international crime in case of text message scams.

10.4.SMS Sender IDs

According to section 10.8 of the Regulation, the telecommunications operator must block any text messages sent to the subscribers of the Finnish mobile network with a protected SMS Sender ID in APIs and international interfaces, if their sender is not verified as the legal person that has registered said ID. The telecommunications operator must also have the capability to edit certain other SMS Sender IDs or block the messages sent using them in APIs and international interfaces.

By registering SMS Sender IDs they use with the Finnish Transport and Communications Agency, the parties that send text messages can protect their SMS Sender IDs and ensure that no other party can use the same SMS Sender IDs. This requirement implements the protection mentioned above. The deployment of a registered ID may require that the traffic it contains is directed via an interface specified by the telecommunications operator.

Application

Once Traficom has registered an SMS Sender ID to be protected, there is a three-month transition period, during which the SMS service provider that registered the SMS Sender ID must enter into an agreement on the use of the protected ID with one or more Finnish telecommunications operators. The agreement can also be made with a service provider such as an SMS aggregator.

After three months from the registration of the SMS Sender ID, telecommunications operators must block any text messages sent with a protected SMS Sender ID in APIs and international interfaces, if their sender is not verified as the legal person that has registered said ID. This means that e.g. if the ID was registered on 15 November 2023, the ID must be blocked in APIs and international interfaces on 15 February 2024. If the blocking date falls on a weekend or public holiday, the blocking can be implemented on the following business day.

After the transition period following the registration, messages with the protected SMS Sender ID can no longer be sent to recipients from abroad via the public international interface; instead, the traffic must be brought to the network via APIs offered by Finnish telecommunications operators. Traffic is not restricted between Finnish telecommunications operators or within the network, and therefore the SMS service provider must decide if it wishes to enter into an agreement on the transmission of messages with one or more telecommunications operators.

When Traficom registers an SMS Sender ID, the protection provided by the registration covers the following formats of that SMS Sender ID: the format applied for (e.g. 'SigN'), as well as the formats in which the ID is written starting with an uppercase letter and otherwise in lowercase letters ('Sign'), in whole lowercase ('sign') and in whole uppercase letters ('SIGN'). These forms of writing are to be blocked by telecommunications companies on the basis of registration by Traficom.

Recommendation

Traficom recommends that telecommunications companies automatically add to the block list also other uppercase and lowercase variants of the SMS Sender ID as well as variants that include extra space characters, if this is easy to implement.

11. Statistics at the public international interface

Section 11 of the Regulation requires telecommunications operators to compile monthly statistics on calls terminating from the public international interface when the calling party number is a Finnish telephone number. The statistics must include the following information:

1) the total number of calls

2) the number of calls blocked in accordance with section 10.4 of the Regulation broken down by mobile network subscriber numbers, including subscriber numbers beginning with 0299, and other Finnish telephone numbers

3) the total number of calls connected forward in accordance with section 10.4 of the Regulation because of roaming

4) the total number of forwarded calls in accordance with section 10.5.1 of the Regulation with the restriction of calling line identification activated.

The purpose of the obligation is to enable the monitoring of the effectiveness and functionality of measures. The obligation to compile statistics is set in rather broad terms, only requiring the monthly total figures for calls in accordance with subsections 1–4. Telecommunications operators may themselves find it necessary to compile more detailed statistics, but decisions regarding their implementation is left to the operators' discretion.

Chapter 5 Entry into force

12. Entry into force and transitional period

The Regulation enters into force on 9 November 2023 and will remain in force until further notice.

The change of SMS numbers and the blocking of the identifier "Tuntematon" (Unknown) in section 10.7 of this Regulation shall apply from 15 January 2024 onwards, and section 10.8 of this Regulation shall apply from 1 February 2024 onwards. These transition periods have been provided for in order to allow telecommunications operators enough time to implement the necessary measures and test the functioning of the arrangement.

This Regulation repeals the Finnish Transport and Communications Agency Regulation on the interoperability of communications networks and services (28 J/2022 M) of 9 May 2022.

The Regulation is included in the Series of Regulations issued by the Finnish Transport and Communications Agency in Finlex, the Electronic Statutes of Finland [3], and can be obtained from the Agency's customer service.

Chapter 6 Recommendations regarding the implementation of SIP services

This chapter provides some recommendations regarding the implementation and interoperability of SIP services that are not directly related to any specific section of the Regulation.

13. Interoperability of fax services

Even though fax use has seen a marked decrease as new communications services have been taken in use, the fax is still a necessary communication tool in certain contexts. In order to ensure the functionality of this service, fax performance in the IP network must be ensured.

The implementation of fax services in subscriptions using VoIP technology has proven challenging. Problems have been posed by insufficient support for devices on the transmission path as well as insufficient testing of products, device performance and numerous compatibility issues. The problems detected have been discussed in more detail, for example, in a problem statement prepared by the SIP Forum FoIP Task Group[1] [28].

The SIP Forum FoIP Task Group has determined solutions to eliminate the observed problems. Proposals for remedies and improvements have been published in at least

[1] https://www.sipforum.org/activities/technical-wg-overview-and-charter/foip-task-group-charter/

the following standards, published by ITU-T between 2009 and 2010 and by IETF in 2013:

- IETF RFC 6913 [29];
- ITU-T T.38 [30];
- ITU-T V.152 [31];
- ITU-T V.153 [32].

Recommendation

It is recommended that telecommunications operators providing fax services pay attention to fax service support, interoperability and performance in their equipment and software acquisitions. Telecommunications operators are advised to utilise products conforming to the aforementioned latest standards, in which efforts have been made to the fix the observed problems.

14. Connection of SIP PBXs to the public telephone network

The interface for SIP-based PBXs has not yet been fully standardised, leading to challenges regarding the interconnection of these PBXs to the public telephone network. Telecommunications operators have been forced to test the PBXs in order to be able to identify the PBXs compatible with the provided service. Even if a PBX has been found to be compatible, some adaptations may still have been required. The use of a shared interface that everyone could try to support would benefit both customers and telecommunications operators.

Recommendation

It is recommended that telecommunications operators provide their customers with a network-to-network interface conforming to the SIP Forum's SIPconnect 2.0 specifications [33] for interconnecting SIP-based PBXs to the public telephone network.

15. Anonymisation of SIP addresses in the call itemisation of a subscriber bill

This section presents the Finnish Transport and Communications Agency's recommendation regarding the anonymisation of SIP addresses in the bill itemisation provided to subscribers. Section 134, subsection 4 of the Act on Electronic Communications Services (Bill itemisation and connection-specific itemisation), lays down the following with respect to the itemisation provided to a subscriber:

> "*Upon request by the subscriber, the telecommunications operator shall provide the itemised bill free-of-charge. Unless otherwise provided in subsections 2 or 3, such an itemisation shall be provided in a form where the last three digits of the phone number are obscured or the itemisation otherwise rendered such that the other party of the communication cannot be identified.*"

Since the last three digits of SIP addresses cannot be obscured, telecommunications operators must otherwise ensure that the other communication party cannot be identified on the basis of the itemisation. In the Finnish Transport and Communications Agency's opinion, a safe alternative would be to only indicate the connection's time, duration, charge and SIP address in a completely anonymised form in the itemisation provided to the subscriber. This means that the itemisation indicates that a SIP address has been called, but the user component and domain component of the SIP URI are both anonymised. A good starting point would be to not reveal even the length of the

address or domain. Furthermore, the Finnish Transport and Communications Agency recommends that this practice is explained to the party requesting bill itemisation in, for instance, the itemisation itself, since this type of practice is likely to be new and unfamiliar to that party.

The section in question also notes that identification data concerning free-of-charge services shall not be indicated in an itemised bill. If calling, for instance, other SIP addresses in the same network is free of charge, the itemisation may not include the identification data of these connections.

Section 134 of the Act on Electronic Communications Services also includes provisions on how services provided at additional charges must be itemised on a bill. At the time of drafting this recommendation, such services are not being provided from SIP addresses, so the Finnish Transport and Communications Agency has not considered it necessary to issue a separate recommendation concerning the subject.

Chapter 7 Annexes and references

16. List of references

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