Installation notes and configuration help
IPfonie® Extended Connect

Plusnet
Wir leben Kommunikation

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1. Summary of parameters

Summary of all important parameters

Parameter	Registration mode[1]	Registration mode[1] with TLS/SRTP encryption	Fix IP mode[2]
SIP User Name / SIP Login Name	Contract number plus four random digits		not applicable
Password length (in myPlusnet)	from 8 up to 25 characters		not applicable
Allowed password characters	A-Z a-z 0-9 ! # $ % & / ( ) = ? * [ ] _ : . , { } +-		not applicable
SIP server / SIP registar	sipconnect.ipfonie.de (only SRV records, no IN A DNS entry)	secure-sipconnect.ipfonie.de (only SRV records, no IN A DNS entry)	-
Peering addresse of the Plusnet SBC	-		via DNS resolution of: sipconnect01.ipfonie.de and sipconnect02.ipfonie.de
Media port range on Plusnet side	20000 till 59999 UDP		20000 till 59999 UDP
Standard SIP port	5060 UDP and TCP	5061 TLS (TLS 1.2)	5060 TCP
STUN server	no entry		not applicable
SIP proxy / proxy server	no entry		no entry
SIP URI	<number in +E.164 format>@sipconnect.ipfonie.de		-
Domain	sipconnect.ipfonie.de	secure-sipconnect.ipfonie.de	-
Enable in firewall policy	213.148.136.0/23 and 62.206.200.0/22	62.206.3.0/24	213.148.136.0/23 and 62.206.200.0/22
Root certificate and CA	not applicable	current DigiCert Global Root	
NAT	NAT is allowed, but no SIP ALG / SIP Helper or STUN		connection only to official IP (no NAT or ALG allowed)

Important note: please address any question concerning the use of the above described parameters within the configuration of your PBX to the support of your PBX, as Plusnet does not possess any manufacturer specific PBX configuration guides.

[1] Also called registered mode or dynamic mode.
[2] Also called static mode or peering mode.

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2. Introduction and automatic mail confirmations

This document is supposed to help you to set up any kind of SIP-compatible hardware or software for operation with IPfonie®. Extended Connect (SIP trunk with SIPconnect 1.1 protocol for PBX systems) and to configure them in the best possible way.

If you ordered IPfonie®. Extended Connect online, the "Benutzer" (user), who was defined in the Plusnet Portal, will get automatically generated e-mails. If you ordered IPfonie®. Extended Connect "offline" with the PDF form, the "Technischer Ansprechpartner" (technical contact person) will get these e-mails.

If you did not receive these e-mails, please check your SPAN directory and add the sender info@plusnet.de to your white list:

Confirmation e-mail for the activation of your Plusnet Portal console (you will not receive this e-mail in the case that your Plusnet Portal console was already associated with your customer number).

Figure 1: Screenshot of the e-mail, which confirms the activation of the Plusnet Portal

Please activate your Plusnet Portal console by clicking on „Account aktivieren" ("activate account")

Confirmation e-mail of the SIP trunk order acceptance (you will receive this mail in the case you ordered the SIP trunk with registration and in case you ordered it with fix IP authentication)**:**

„…
From: info@plusnet.de

Content:

Kundenname: <CompanyName>
Kundennummer: <YourCustomerNumber>
Vertriebspartner Nummer: <PlusnetNumberOfYourTrader>
Sub-Trader ID: <PlusnetNumberOfYourSucTrader>

Sehr geehrte Damen und Herren,

herzlichen Dank für die Einreichung Ihres Auftrages für das Produkt <short product name like Ipfonie Extended ConnectR>, dessen Eingang wir hiermit bestätigen.

Wir freuen uns sehr darüber, dass Sie sich für die Plusnet GmbH entschieden haben.

Ihrem Auftrag wurde die vorläufige Vertragsnummer: <ContractNumberOfSIPTrunk> zugewiesen.

Folgende Anschlussadresse ist gewünscht:
<CompanyName>
<YourStreetAddress>
<Your zip and town>

Bitte verstehen Sie diese E-Mail als Auftragseingangsbestätigung. Über den weiteren Verlauf der Bearbeitung werden wir Sie entsprechend informieren.

Vielen Dank!

Mit freundlichen Grüßen

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Confirmation e-mail of the SIP trunk installation in the case you ordered the SIP trunk with registration modus:

„…
From: info@plusnet.de

Content:

Kundenname: <CompanyName>
Kundennummer: <YourCustomerNumber>
Vertragsnummer: <ContractNumberOfSIPTrunk>

Sehr geehrte Damen und Herren,

mit diesem Schreiben bestätigen wir Ihnen heute, dass wir Ihren Auftrag für unser Produkt <kurzer Produktname wie z. B. IPfonie Extended ConnectR> erhalten und akzeptiert haben. Hier-mit teilen wir Ihnen mit, dass wir für Sie einen SIP-Trunk mit der Vertragsnummer <Vertrags-nummer des SIP-Trunks> eingerichtet haben.

Die zugewiesenen Rufnummern können Sie im Plusnet Kundenportal über das Dashboard und die Produktgruppe "IPfonie SIP" -> in Ihren IPfonie-Produkten und die IPfonie Vertragsnr. -> „<kurzer Produktname> Vertragsnummer: <Vertragsnummer>" (Mitte) -> den "Aktion"-Knopf und "Bearbeiten" -> die IPfonie Vertragsdetails im Abschnitt "Nutzungsstandorte" mit dem "Aktion"-Knopf und "Bearbeiten" -> im Abschnitt "Rufnummernblöcke" einsehen.

Für Ihre Sprachkanäle ist die TLS/SRTP-Verschlüsselung <eingerichtet, nicht eingerichtet)>.

Über das Dashboard und die Produktgruppe "IPfonie SIP" -> in Ihren IPfonie-Produkten und die IPfonie Vertragsnr. -> „<kurzer Produktname> Vertragsnummer: <Vertragsnummer>" (Mitte) -> den "Aktion"-Knopf und "Bearbeiten" -> den Abschnitt "Accounts" und die konkrete Account-ID in den IPfonie Vertragsdetails mit dem "Action"-Knopf und "Bearbeiten" -> können Sie den/die diesem SIP-Trunk zugewiesenen SIP-Login(s) einsehen. Im Abschnitt "Account Passwort" müssen Sie nun noch für diese(n) Login-Namen ein geheimes Login-Passwort vergeben.

Wichtige Bemerkung: bitte wählen Sie das Passwort sorgfältig und gemäß den Regeln zur Festlegung sicherer Passwörter. Immer wieder mal kommt es vor, dass unsichere Passwörter von kriminellen Elementen genutzt werden, um auf fremde Kosten große Geldsummen zu vertelefonieren. Insbesondere ermöglicht eine einfache Ziffernfolge wie 1234, o. ä. Hackern einen schnellen Erfolg. Eventuell hierdurch entstandene Schäden kann Ihnen die Plusnet GmbH nicht ersetzen, insbesondere da unsichere Passwörter heutzutage fahrlässig sind.

Im Dashboard und den Link "Dokumente" finden Sie auch ausführliche Installationshinweise, von denen Sie bitte das passende downloaden.

Gleichzeitig nutzbar Sprachkanäle: <Anzahl gebuchter Sprachkanäle>

Optional eingerichtete, abgehende Anrufsperren:
* Internationale Rufnummern: <Sperre eingerichtet / nicht eingerichtet>

Optional eingerichtete Freischaltung von Service-Rufnummern (SRN):
* Auskunftsdienste (118x): SRN sind <nicht freigeschaltet/freigeschaltet>
* Alle 0900x-Servicerufnummern: SRN sind <nicht freigeschaltet/freigeschaltet>
* 0900-1-Servicerufnummern: SRN sind <nicht freigeschaltet/freigeschaltet>
* 0900-1- und 0900-3-Servicerufnummern: SRN sind <nicht freigeschaltet/freigeschaltet>
* Sonstige Dienste (0181-0189, 0191-0194): SRN sind <nicht freigeschaltet/freigeschaltet>

Bitte warten Sie mit der Nutzung dieses SIP-Trunks noch auf mindestens eine weitere, automatisierte E-Mail, in der Ihnen die konkrete Zuweisung von Rufnummern und Nutzungsstandorten für diesen SIP-Trunk bestätigt wird.

Hinweis für IPfonie Basic, IPfonie Extended, IPfonie Extended Link und IPfonie Extended Connect Kunden:

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Rufaufbau, der unter Einsatz Software- oder Hardware-basierter Lösungen - bei Nutzung eines oder mehrerer Accounts - automatisiert und zeitgleich betrieben wird ("Power Dialer"), ist nicht gestattet. Ein möglicher Einsatz kann nur nach Prüfung und schriftlicher Genehmigung durch die Plusnet GmbH erfolgen.

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.Confirmation e-mail of the SIP trunk installation in the case you ordered the SIP trunk with fix IP authentication:

„…
From: info@plusnet.de
Content:

Kundenname: <CompanyName>
Kundennummer: <YourCustomerNumber>
Vertragsnummer: <ContractNumberOfSIPTrunk>

Sehr geehrte Damen und Herren,
mit diesem Schreiben bestätigen wir Ihnen heute, dass wir Ihren Auftrag für unser Produkt <product code like IPF-CONN-EK-ACC-FIX> erhalten und akzeptiert haben. Hiermit teilen wir Ihnen mit, dass wir für Sie einen SIP-Trunk mit folgenden Parametern eingerichtet werden:

CPE- und Vertragsnummer dieses SIP-Trunks: <ContractNumberOfSIPTrunk>

IP-Adresse Ihres HauptServers: <FixPublicIPAddressOfYourMainServer>

IP-Adresse Ihres optionalen Backup-Servers: <OptionalFixPublicIPAddressOfYourBackupServer>.

Gleichzeitig nutzbar Sprachkanäle: <NumberOfOrderedVoiceChannels>

Optional eingerichtete, abgehende Anrufsperren:
* Internationale Rufnummern: <Sperre eingerichtet / nicht eingerichtet>

Optional eingerichtete Freischaltung von Service-Rufnummern (SRN):
* Auskunftsdienste (118x): SRN sind <nicht freigeschaltet/freigeschaltet>
* Alle 0900x-Servicerufnummern: SRN sind <nicht freigeschaltet/freigeschaltet>
* 0900-1-Servicerufnummern: SRN sind <nicht freigeschaltet/freigeschaltet>
* 0900-1- und 0900-3-Servicerufnummern: SRN sind <nicht freigeschaltet/freigeschaltet>
* Sonstige Dienste (0181-0189, 0191-0194): SRN sind <nicht freigeschaltet/freigeschaltet>

Bitte warten Sie mit der Nutzung dieses SIP-Trunks noch auf mindestens eine weitere, automatisierte E-Mail von Plusnet, in der Ihnen die konkrete Zuweisung von Rufnummern und Nutzungsstandorten für diesen SIP-Trunk bestätigt wird.
Hinweis für IPfonie Basic, IPfonie Extended, IPfonie Extended Link und IPfonie Extended Connect Kunden:
Rufaufbau, der unter Einsatz Software- oder Hardware-basierter Lösungen - bei Nutzung eines oder mehrerer Accounts - automatisiert und zeitgleich betrieben wird ("Power Dialer"), ist nicht gestattet. Ein möglicher Einsatz kann nur nach Prüfung und schriftlicher Genehmigung durch die Plusnet GmbH erfolgen.
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Further confirmation mails – an order receipt mail, an order confirmation mail and an activation mail – will be automatically send for each utilisation location you ordered. Amongst others these mails contain the following information:

— the utilisation location

— the allocated number block(s) and single numbers

— the contract number of the utilisation location: „SIP-CONNECT-Standort" resp. „IPF-CONN-STANDORT"

— Your Plusnet Customer Number

If you activated your Plusnet Portal console, you can log into it, where you will first see this "Dashboard":

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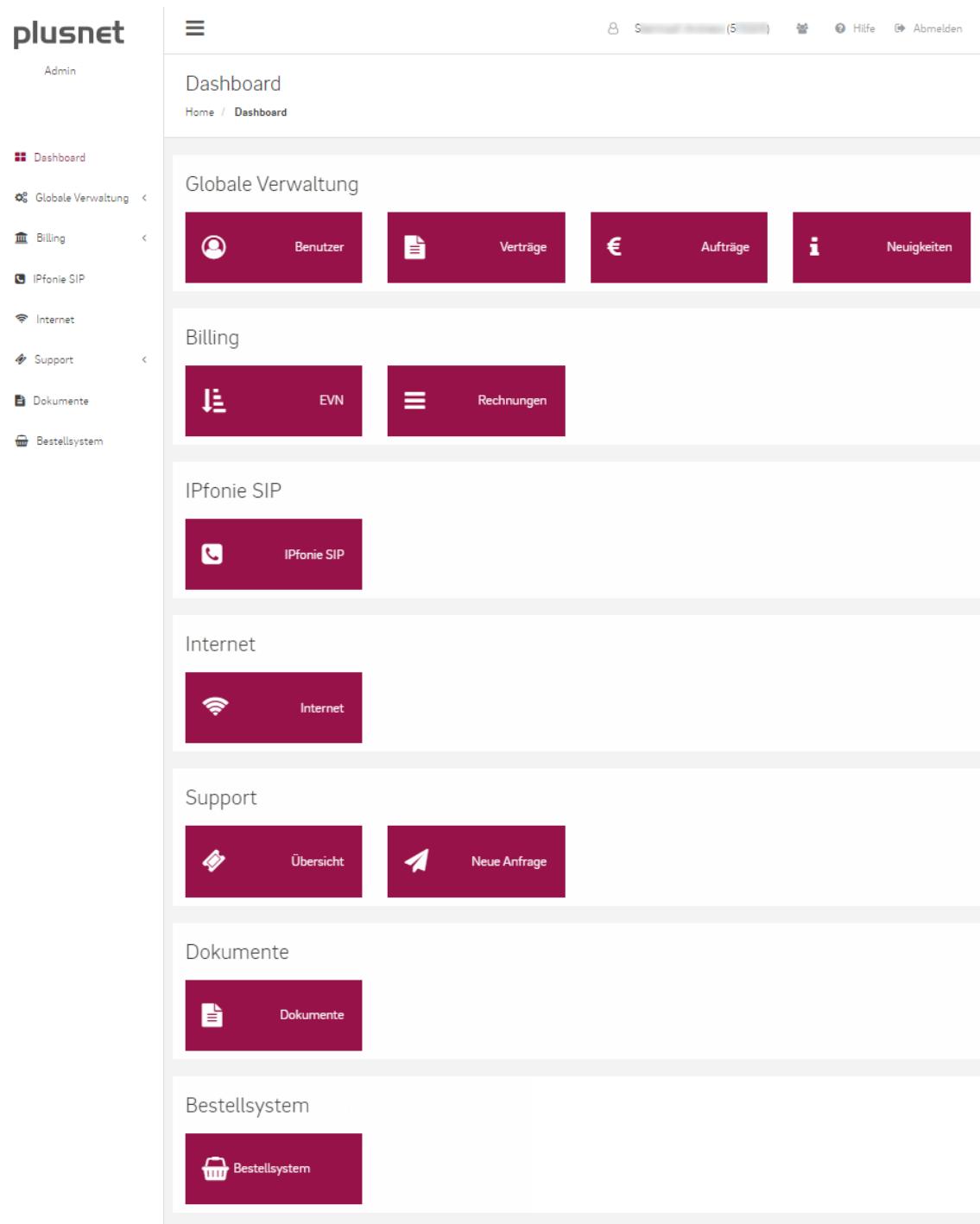
Figure 2: Dashboard of the Plusnet Portal console

The links "Dokumente" ("Documents", on the left side and in the middle below) brings you to a list of documents, which have a connection to the SIP trunk.
Click on "IPfonie SIP" (on the left or in the middle), which will take you to the Plusnet Portal page "Plusnet - IPfonie".

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Figure 3: Plusnet Portal page "Plusnet – IPfonie", example with four SIP connections

In the portal page „Plusnet - IPfonie" you will see the function „Freischalten von Service-Rufnummern" ("Activate service numbers") and in the section „IPfonie" you will see your active IPfonie products, like your active SIP trunks.

If you activate the German service numbers by clicking on „Service-Rufnummern aktivieren", you agree with the offline billing of Plusnet and its partner Ventelo. And you will get the ability to activate or de-activate the different types of service numbers (i. e. numbers billed offline by the respective service provider), when you go to the portal page „Plusnet – IPfonie-Account", which you are able to see in the Figure 5.
NB: this does not apply to the IPfonie® Extended Connect SIP trunk with fix IP authentication: here the activation has to be ordered by means of the PDF order form.

If you ordered the SIP trunk with a registration, go on with the following chapter. In case you ordered the SIP trunk with fix IP authentication, please continue which chapter 4.

3. Manage SIP trunk with registration mode in the Plusnet Portal

You are able to reach the following Plusnet Portal page "Plusnet – IPfonie Vertragsdetails" ("Contract details") by choosing "Bearbeiten" ("Edit") of the "Aktion" button behind the SIP trunk you intend to configure.

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Figure 4: Plusnet Portal page "Plusnet – IPfonie Vertragsdetails", registration mode

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On this portal page the first section „IPfonie Vertragsdetails" ("Contract details") shows the „Vertragsnr." ("Contract number", often referred as CPE number), the „Produktcode" ("Product code"), the "Produkt-kurzname" ("Short product name") and "Ihre Referenz" ("Your reference"). The short name .can be the one for an end customers product („IPfonie Extended Connect") or a resellers product („Plusnet Resale SIP-Connect"), with registration mode ("R") or with the fix IP authentication mode ("F") and the optional "Kombi-Option" ("Kom", the SIP trunk is combined with a Plusnet access).

In the field „Ihre Referenz" you could enter a reference number or reference name of your company, which will be shown on your invoice.

In the following section „Accounts" the login name(s) of the SIP trunk is(are) shown.

In the bottom section „Nutzungsstandorte" („Utilisation locations") you will find all utilization locations, which are assigned to this SIP trunk. Please check all postal addresses of all these locations carefully, as in the case of an emergency call and a mute caller, the rescue service will drive to exact these addresses.

If you click on the „Aktion" ("Action") button on the right side of the SIP trunk „Loginname" ("Login name") and choose „Bearbeiten" ("Edit"), you will come to the Plusnet Portal page „Plusnet - IPfonie Account":

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Figure 5: Plusnet Portal page "Plusnet – IPfonie Account", registration mode

In the line "Loginname" ("Login name"), you can see that the Plusnet system generates a single, **fixed login name. It consists of the contract number of the SIP trunk** (Plusnet likes to call it the CPE number), **directly followed by a four-digit random number**. The latter improves the security of the login name.

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The SIP logins described above require you to assign a SIP password for each login. This is done in the fields "Neues Passwort" ("New password") and "Neues Passwort wiederholen" ("Repeat password") in the sectiontitled "Account Passwort" ("Password account") as shown in the figure above.

The length of the password must be minimal eight and maximal 25 characters.

These are the allowed characters: A-Z a-z 0-9 ! # $ % & / ( ) = ? * [ ] _ : . , { } +-

Not allowed are amongst others: Ü Ö Ä ü ö ä ß \ < > ` | € § ´ ~ ^ ° @

Important note: Please choose your SIP login password(s) carefully and according to the rules for secure passwords. It does happen that weak passwords are exploited by criminals to spend huge sums on phone calls at someone else's expense. Plusnet GmbH cannot compensate you for such damage, particularly because insecure passwords are nowadays considered negligent.

With this SIP login name and password, you can now configure your SIP-compatible hardware or software as describe in the chapter 6.

You also will see the line "Stammrufnr." ("Default root number"). In normal use, this number will not be used nor shown in the CDR data or as CLIP. This "nomadic" resp. "national" number of the type 032 only occurs in the CDR data and at the called party as CLIP (Calling Line Identification Presentation), if the PBX is not signalling an officially assigned number while calling outbound, and therefore it is an obvious hint, that the PBX (or your E-SBC) was not configured properly.

Please continue with the administration of the utilisation location(s) as described in chapter 5.

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4. Manage SIP trunk with fix IP authentication mode in the Plusnet Portal

If you have an IPfonie Extended Connect SIP-trunk with fix IP authentication and click in the Plusnet Portal page "Plusnet – IPfonie" (see Figure 3) on the "Aktion" button behind it, you can chose "Bearbeiten" to reach the following page "Plusnet – IPfonie Vertragsdetails" ("IPfonie contract details"):

Figure 6: Plusnet Portal page "Plusnet – IPfonie Vertragsdetails", fix IP authentication mode

In the top section you will see the contract details contract number, product code and short product name.

In the field „Ihre Referenz" („Your reference") you could enter a reference number or reference name of your company, which will be shown on your invoice.

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In the next section "IP Adressen" ("IP addresses") **you should check**, whether Plusnet configured the correct IP address of your main server (behind "IP-Adresse des Hauptservers") and optional your backup server (behind "IP-Adresse des Backupservers").

You also will see the line "Stammrufnummer" ("Default root number). In normal use, this number will not be used nor shown in the CDR data or as CLIP. This "nomadic" resp. "national" number of the type 032 only occurs in the CDR data and at the called party as CLIP (Calling Line Identification Presentation), if the PBX is not signalling an officially assigned number while calling outbound, and therefore it is an obvious hint, that the PBX (or your E-SBC) was not configured properly.

In the bottom section „Nutzungsstandorte" („Utilisation locations") you will find all utilization locations, which are assigned to this SIP trunk. Please check all postal addresses of all these locations carefully, as in the case of an emergency call and a mute caller, the rescue service will drive to exact these addresses.

Please continue with the administration of your utilisation location(s) as described in the following chapter.

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5. Managed utilisation locations

In the bottom section of the Plusnet Portal page "Plusnet – IPfonie Vertragsdetails" (see also Figure 4 and Figure 6) all utilisation locations, which are assigned to this particular SIP trunk, are listed. By clicking on the "Aktion" button behind each utilisation location and choosing "Bearbeiten", you will come to the following page called ""Plusnet Nutzungsstandort" ("Utilisation location"):

Figure 7: Plusnet Portal page „Plusnet - Nutzungsadresse", with one number block

In the top section "Nutzungsstandort" will find the postal utilisation address, which you should carefully check because of its importance for emergency calls.

In the field „Ihre Referenz" („Your reference") you could enter a reference number or name of your company, which will be shown on your invoice. For instance, this could help you to indentify your costs per location on your detailed Plusnet invoice.

In the following section "Rufnummernblöcke" ("Number blocks") you will see all numbers and number blocks, which are allocated to this utilisation location and whether they are active or not. In the figure above you see an example of an active number with the size 30 (e. g. 30 direct dial in numbers), which starts with the direct dial in (DDI) number 30 and ends with the DDI number 59. In the field "Status" you will alternatively see "ported" if the DDI have been ported to Plusnet.

Now you are able to start with the configuration of your SIP device like your PBX or gateway or E-SBC.

6. Configuration of SIP-compatible hardware or software with SIP registration

In order to place phone calls via IPfonie® Extended Connect, it is usually necessary to configure the following parameters in the interface of your SIP device, like PBX, Unified Communication and Collaboration system, ACD system, gateway, E-SBC or telephony software.

Important note: please address any question concerning the use of the below described parameters within the configuration of your PBX to the support of your PBX, as Plusnet does not possess any manufacturer specific PBX configuration guides.

6.1 SIP user name

Also named: authorisation name, authentification ID, authentification ID or SIP ID.
The "SIP user name" is the login name described in chapter 3, which is the SIP trunk contract number plus four random digits.

Please do not use separators like spaces, slashes "/" or dashes "-", since these are not part of the login name.

6.2 SIP password

The "SIP password" is the login password you assigned via the Plusnet Portal as described in chapter 3.

6.3 SIP server / SIP registrar

Also named: registar, provider registrar, registration server name or registrar host name.
The Plusnet SIP server or registrar for IPfonie® Extended Connect is:

sipconnect.ipfonie.de for the SIP trunk variant **without** encryption and
secure-sipconnect.ipfonie.de for the SIP trunk variant **with** encryption

Important notes: The IP addresses of the VoIP servers sipconnect.ipfonie.de (respectively secure-sipconnect.ipfonie.de) can change from time to time, e.g. when Plusnet expands its network. Such changes will not interrupt active connections. In such an event, the resolution of the DNS entry sipconnect.ipfonie.de (respectively secure-sipconnect.ipfonie.de) causes the connection routing to be changed to a different SBC (Session Border Controller; it terminates the SIP signalling and media data). This ensures that subsequent registrations are fully handled by this other SBC.

As long as you use the DNS entry, as recommended by us, and not the static IP address of the current SBC, no future adaptation will be necessary on your side.

Furthermore, one should consider that sipconnect.ipfonie.de (and secure-sipconnect.ipfonie.de) does not offer IN A Record but only SRV, because this ensures the automatic changeover to an alternative IP address in case the primary IP address is not reachable. This will provide the best SIP trunk redundancy to your PBX system.

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6.4 Media port range

The SIP port range for media must be specified from **20000 to 59999**. If desired, the same port range can also be configured on the customers SIP device. Alternatively the customers SIP device can also use another port range.

6.5 Standard SIP port

Also named: registar port, registering port, external SIP port.
The standard port to be configured here is the usual **SIP port 5060 UDP or even better TCP** (respectively **5061** for the TLS/SRTP encryption option). However, a different port can be used if desired.

6.6 STUN server

This optional parameter should have **no entry**, since the SIP-based products from Plusnet do not use a STUN server.

Some devices will also ask for "NAT Traversal", which should be set to "No".

6.7 NAT Expire Timer or Session Expire Timer

If a "NAT Expire Timer" or "Session Expire Timer" can be set, it should be set to a higher value than the "SIP Expire Timer" to ensure that the NAT function does not inhibit the SIP session.

A good standard value is 30 seconds.

6.8 NAT ALG

Some routers feature a NAT respectively a SIP ALG (Application Level Gateway). However, due to the SBC infrastructure of Plusnet, a NAT ALG or SIP ALG should not be used, so SIP messages can be transmitted as unaltered as possible.

6.9 SIP proxy or proxy server

Also named: proxy server, provider proxy, provider outbound proxy, SIP server name or outbound proxy.
Configuring a SIP proxy, can lead to problems in some cases, which is why this field should generally be **left empty**. For IPfonie® Extended Connect, the proxy server is identical with the SIP registrar sipconnect.ipfonie.de (respectively secure-sipconnect.ipfonie.de).

Some devices (e.g. Auerswald PBX) require the field "Outbound proxy" to be set to sipconnect.ipfonie.de, too.

6.10 SIP URI

If this parameter is asked for, enter <telephone number with area code in +E.164 format>@sipconnect.ipfonie.de (respectively @secure-sipconnect.ipfonie.de).
Example: +492216698000@sipconnect.ipfonie.de

Note that some devices (e.g. Nokia E65) refer to this parameter as "Public user name".

6.11 Domain

Also named: SIP domain or SIP server.
Some devices (e.g. Auerswald PBX) also ask for a "Domain". Again, just enter sipconnect.ipfonie.de (respectively secure-sipconnect.ipfonie.de).

6.12 Codecs

In case your PBX gives you the free choice of the used codecs and their relative priorities, please consider the following remarks as they became important due to the switch over of the PSTN internetworking to Next Generation networks (NGN) internetworking.

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The truly single voice codec which all German (and European) ITSP have to support is the **G.711 A-Law** codec (with a packet size of 20 ms). This makes it mandatory, that this codec always has to be included in the list of offered codecs. If only the US American codec G.711 µ-Law is offered the called parties VoIP device or even the called parties ITSP can refuse it.

For **voice calls** it is recommended to also offer the **G.722** codec with a higher priority in the offer list. This is because the majority of the IP based PBX systems do support it now and because it features the double bandwidth for a significant better audio experience. This codec can be transmitted to most of the ITSP so it can be used cross-ITSP and cross-PBX. Also the IP-to-ISDN interconnections of Plusnet to the classical PSTN support this codec but do have to transcode it to the G.711 A-Law codec.

For the **fax communication** the **T.38** codec should be offered in the first place, as it is more robust when packet loss burdens the IP transmission path. Unfortunately also this codec is not supported by all VoIP fax devices nor NGN interconnects. In particular the NGN interconnects of the Deutsche Telekom do refuse it still (date: 10/2019). So make sure, that the fax feature of you PBX also offers the G.711 codec as a fallback. In conjunction with fax this codec also is called **G.711 pass through, transparent mode or clear channel**.

For the transmission of DTMF (Dual Tone Multifrequency) - which often are used to control voice routing systems – the "RFC 2833" method has to be configured and used.

6.13   Firewall settings

If you are using a firewall in the data path of the IPfonie data, take care of the following:

— You need to open the SIP-relevant sessions only from "inside to outside", because at the beginning, your User Agent Client (UAC, this is your SIP device like your PBX) starts the SIP session from "inside to outside" with its SIP registration.

— Rather than a single, fixed IP address for the SBCs of Plusnet, the **IP subnets 213.148.136.0/23 and 62.206.200.0/22** (if you are using the variant with TLS/SRTP encryption, only the subnet **62.206.3.0/24**) must be configured in the firewall policy, which include the IP addresses of all required VoIP-relevant components of Plusnet including the SBCs.

6.14   Notes for redundant PBX setup

Plusnet provides this SIP trunk in registration mode if this mode has been ordered.

As described in chapter 3, in this mode the customer is assigned a SIP account (which consists of a login name and a password) for the PBX.

For such a SIP account, multiple registrations can be sent by multiple mediation servers (also called gateways or E-SBC) **of the same logical PBX system**. When a call comes in, all registered mediation servers are addressed in a round robin procedure, which ensures load balancing if several mediation servers are operated in parallel. If a customer media server does not respond to IP packets from the Plusnet NGN, it will not get anymore incoming calls until it responses again. This makes it very easy to add or remove (e.g. for maintenance) mediation servers during live operation without service impact.

6.15   Configuration of the TLS/SRTP encryption option

Plusnet delivers this TLS/SRTP encryption option for the SIP trunk variant with SIP registration (not for the variant with fix IP authentication). It is strongly recommended, to use this option only with PBX systems, which have been approved for this option.

In any case this option was ordered and delivered, the signalling will be exclusively done with the TLS protocol (Transport Layer Security) and the media data will be exclusively transported with the SRTP protocol (Secure Real Time Protocol).

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To connect the SIP trunk to the customer-side PBX in this mode, the following prerequisites and settings are required (please consider the differences to the parameters of the non-encrypted standard version):

— The SIP communication will only take place to the **Plusnet IP subnet 62.206.3.0/24**. So this subnet should be opened in the customers firewall for the SIP communication. And this subnet can be used as source and destination address for prioritization of the VoIP traffic in all involved transmission components and paths like an internet access line of a third party provider.

— For the TLS as well for the SRTP so-called ciphersuites (a combination of specific encryption algorithms) are offered and negotiated, like for instance with TLS „TLS_DHE_RSA_WITH_AES_128_CBC_SHA256" or with SRTP „AES_CM_128_HMAC_SHA1_80". Please consult the installation guide of your PBX system or your E-SBC to see, which **ciphersuites** are supported.

— The SIP server respectively SIP registar is **secure-sipconnect.ipfonie.de**

— The media port range on the Plusnet side is 20000 till 59999 UPD

— The standard SIP port is **5061 TLS** (differs to the non-encrypted standard version)

— Your PBX system respectively your E-SBC should support TLS version 1.2.

— Plusnet uses public TLS certificates of the **CA** (Certification Authority) "**DigiCert**". To verify the authentication of these certificates, your PBX system (respectively your E-SBC) should cope with the root certificates contained in "DigiCert Global Root " (https://www.digicert.com/kb/digicert-root-certificates.htm) of the CA DigiCert, of which the Plusnet SBC are using an up-to-date one. In many cases, this DigiCert root certificate should already be contained in the list of the standard CA of your PBX system respectively of your E-SBC. If not, please consult the manufacturers installation guides or support to learn, who to integrate another root certificate.
In the case of a Windows server the validation of the Plusnet certificate would fail, if the root certificate of DigiCert was not installed in the certification store of the Windows server. In this case the appropriate „DigiCert Global Root" certificate has to be imported into the Windows store via a Windows update or manually. **Please verify the fingerprints of this root certificate.**

— Further hints are to be found in the SIP trunk specification of Plusnet .

7. Configuration of a PBX with fixed-IP authentication

Alternatively, Plusnet can provide (only) the SIP trunk IPfonie®. Extended Connect with "fixed-IP authentication" – also referred to as "peering mode" or "static mode" – if this mode has been ordered.

In this mode, a static SIP trunk is configured between two IP terminal points. In this case, no login via SIP registration and SIP account takes place.

To connect the SIP trunk to the customer-side PBX in this mode, the following prerequisites and settings are required:

— A permanent Internet connection (e.g. Internet or IP VPN uplink from Plusnet if an end-to-end SLA is desired) with at least one (up to two) **fixed, public IP addresse(s)** for the communication between the Plusnet-SIP trunk and the customer-side PBX.

— Direct communication between the Plusnet-SIP trunk infrastructure (these are the Session Border Controllers of the Plusnet NGN) and the customer PBX. It is important that **no NAT** and **no forwarding via an Application Layer Gateway (ALG)** takes place, since the data packets must not be altered.

— The customer PBX must listen to port 5060 TCP for SIP (UDP only on special request).

— Plusnet listens to port 5060 TCP for SIP. Media data from Plusnet comes in via the media port range [20000 - 59999]. These ports must be opened and configured accordingly.

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— Normalisation rules must be configured to ensure that dialled telephone numbers comply with the **E.164 standard** (e.g. +498007722375).

— A QoS policy must be configured on the customer PBX as described in section 0.

— As long as the DNS entry **sipconnect01.ipfonie.de and sipconnect02.ipfonie.de**
is used on the customer side (as highly recommended by Plusnet) and not the static IP address of the current SBC, no future adaptation will be necessary on the customer side.

— If you plan to use an access line (e.g. internet access) of another provider to connect your PBX to the Plusnet NGN, you should contact the technical consulting of this provider to find out an appropriate QoS configuration for the SIP signalling and the SIP media data from/to the Plusnet NGN. This could e. g. be a bidirectional "strict priority queuing" of all data from/to the two Plusnet subnetworks 213.148.136.0/23 and 62.206.200.0/22 (if an un-encrypted SIP trunk is used) respectively 62.206.3.0/24 (if the TLS/SRTP encryption option is used).

— Additional PBX-specific settings for SIP trunks with a static IP address may be necessary.

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7.1 Recommended IP topology

Depending on the requirements specified by the PBX manufacturer and the capabilities of the provider SBCs used by Plusnet – particularly the requirement that the customer PBX must have a fixed, public IP address for the SIP trunk and no NAT and no ALG must be used on the transmission path –, a number of implications regarding the IP WAN connection arise.

The following describes an example for a suitable IP topology in connection with an **Internet uplink** and a server- or PC-based customer PBX. The main characteristic of this IP topology is that the server of the customer PBX has an internal NIC (Network Interface Controller) for connecting to the internal LAN and an external NIC for connecting to the WAN. The latter should ideally be connected to the DMZ ("demilitarized zone") of the firewall, where it can be assigned a fixed, public IP address. On the path from the external network interface of the PBX (see NIC1 in the figure below) to the Plusnet SBC, **no NAT and no ALG function** must be applied, and the ports mentioned above must be opened. Since the Plusnet SBCs are located in two specific IP subnets (213.148.136.0/23 and 62.206.200.0/22 respectively 62.206.3.0/24), the firewall can be configured to allow SIP signalling data and media data only to these subnets.
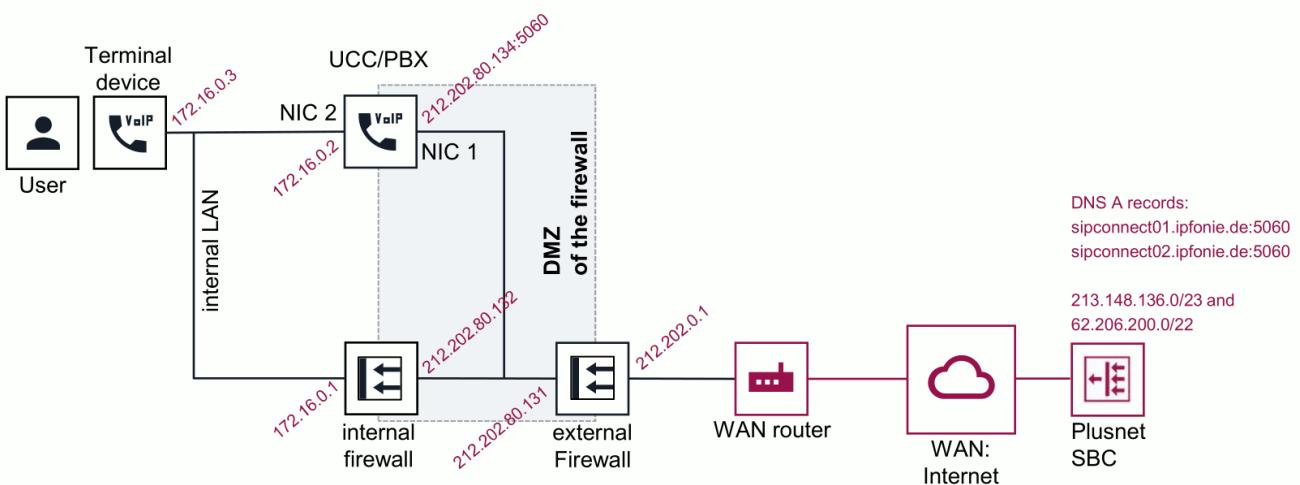
Figure 8: First suitable IP topology on an Internet uplink in fixed-IP mode

Note: If the PBX server is based on Windows Server, a static IP route to the two Plusnet IP subnets via the external NIC of the server should be configured: Two additional network routing table entries should be created with the "route" command.

Example according to Figure 8:
route ADD 213.148.136.0 MASK 255.255.254.0 212.202.80.131 IF 1
route ADD 62.206.200.0 MASK 255.255.252.0 212.202.80.131 IF 1

Alternatively and maybe even more secure also the internal respectively the second NIC of the PBX can be connected to the DMZ of the firewall. If a logical DMZ2 is set up for the NIC2 and a logical DMZ1 is set up for the NIC1, the filter and routing rules can be configured separately for the WAN and LAN side.

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Wir leben Kommunikation
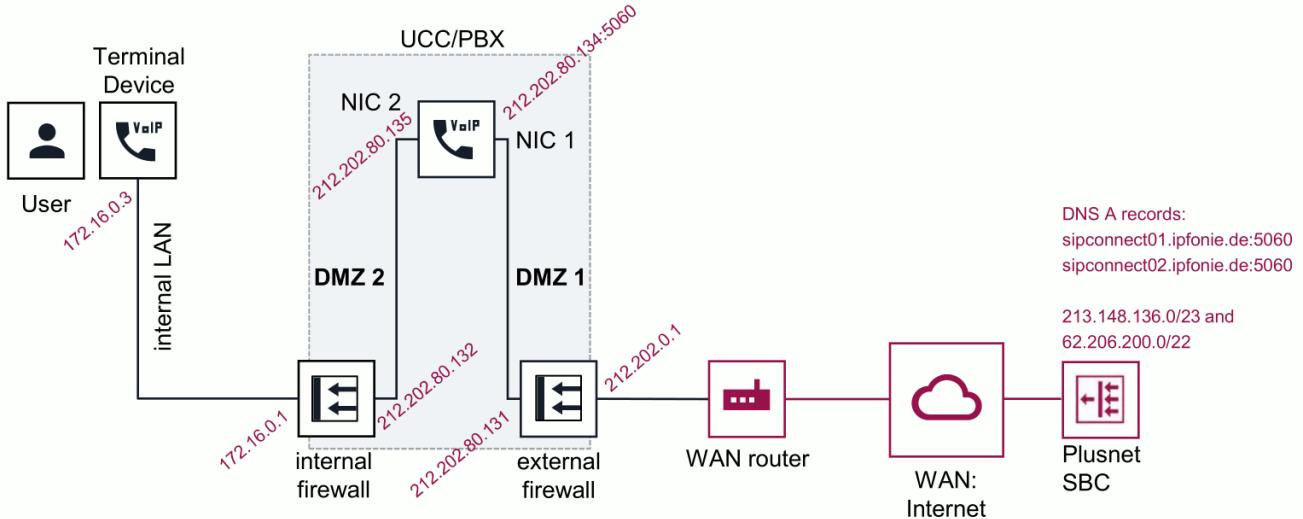
Figure 9: Second suitable IP topology on an Internet uplink in fixed-IP mode

In the next but one chapter 8 you will find how to order and configure a Plusnet internet connection

If you are planning to use an IP VPN uplink for the PBX server or for your location, please contact the Plusnet consulting team for planning your IP topology.

7.2 Notes for redundant PBX setup

When selecting fixed-IP authentication in the order form, it is optionally possible to specify the fixed, public IP address of a second, redundant customer PBX server.

In the Plusnet NGN (more precisely: on the second, redundant Plusnet SBC), this second IP address, i.e. the second server, is configured as the second destination.

Each of the two Plusnet SBCs verifies the availability of its assigned PBX server in short intervals (currently every 60 seconds) using SIP OPTIONS packets. If the OPTIONS are answered, the PBX server is declared "In Service", and calls are routed to it.
If no reply to the OPTIONS is received from a PBX server, the server is set to the status „Out of Service" by its assigned Plusnet SBC, and the messages are sent to the other PBX server via the other Plusnet SBC.

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8. How to use Plusnet internet access for SIP trunks with fix IP mode

The most convenient use of a SIP trunk will be achieved in conjunction with an IP connection, which is optimized for it: since January 2016 Plusnet delivers the SIP trunk IPfonie®. Extended Connect in a complete package which includes such a connection. This "**ready to go" package** is called "**IPfonie®. Extended Connect PLUS**" and can be delivered with the following concurrent call capacities (maximum speech channels): 4 (also on top of a reselled Deutsche Telekom line), 6, 8, 20, 30 and 60.

To get a complete SIP trunk with fix IP mode is simplified with this product: on the order form the customer simply specifies, whether he uses one or two mediation servers. The rest is done by Plusnet: assignment of the appropriate fix IP addresse(s), configure the SIP trunk for this/these IP addresse(s) and inform the customer about it with an automated e-mail.

If bandwidth for internet traffic is needed besides the VoIP traffic bandwidth, one should order the normal Plusnet internet connection and consider the following procedure:

A SIP trunk with fix IP mode (peering mode) can very favourably be used in conjunction with the Plusnet internet and IP VPN connections as these offer many advantages like QoS for the voice data.

When combining a Plusnet-SIP trunk with a Plusnet internet or IP VPN line, the customer is allowed to order the "Kombi Option" of the Plusnet-SIP trunk which offers extra discount prices.

In order to come quickly to a successful installation in conjunction with the fix IP mode of the SIP trunk the following hints for the order of the Plusnet internet connection should be considered.

8.1 Order process

In order to make the processing of an order of a SIP trunk with fix IP mode possible, at least the entry of the fix public IP address of the main PBX mediation server is required. The entry of a secondary peering IP address of a second PBX mediation server is optional.

To get to know the public IP addresses with a Plusnet internet connection – in the following text the example of a 4 Mbit/s Q-DSL® Max line will be used – one has to order them.

This is done on the order form under the topic "Zusatzleistungen" (additional services):
In the case you intend to **connect the PBX mediation server directly to the Router**, within the section "Zusätzliche IP-Adressen" (additional IP addresses) you will have

— to tick the box "4er-Netz (/30) = 1 freie Adresse" (one free IP address in a /30 subnet) to get one suitable IP address for the connection of a SIP PBX. You should also declare the need for the public IP address by writing "Betrieb einer TK-Anlage an einem SIP-Trunk" (operation of a PBX with a SIP trunk) in the field "Verwendungszweck" (purpose).

— to alternatively tick the box "8er-Netz (/29) = 5 freie Adressen" (five free IP address in a /29 subnet) to get five suitable IP addresses for the connection of a SIP PBX. Again, you should also declare the need for the public IP address by writing "Betrieb einer TK-Anlage an einem SIP-Trunk" (operation of a PBX with a SIP trunk) in the field "Verwendungszweck" (purpose).

In the case you intend to **connect the PBX mediation server to the DMZ (demilitarized zone) of a firewall**, which in turn is connected to the Router, within the section "Zusätzliche IP-Adressen" (additional IP addresses) you will have

— to tick the box "4er-Transfernetz" (transfer network) to get four routed public IP addresses to be used within the DMZ of the firewall. In this case the firewall should only route the SIP data.

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Provided, that more servers have to be connected with public IP addresses, a subnet of the appropriate size should be ordered.

In the moment, this internet access line order is processed at Plusnet, the indicated technical contact person will an e-mail amongst others, which contains the assigned IP addresses. The following example shows the case of an ordered "4er-Netz (/30) = 1 freie Adresse":

---beginning of the E-Mail excerpt---

Netzadresse/-Größe.......: 92.198.13.91/32
Subnetzmaske.............: 255.255.255.255
Anzahl der Adressen......: 1
Adresse des Routers......: 92.198.13.91

Netzadresse/-Größe.......: 84.245.144.200/30
Subnetzmaske.............: 255.255.255.252
Anzahl der Adressen......: 4
Adresse des Routers......: 84.245.144.201
Erste verfügbare Adresse.: 84.245.144.202
Letzte verfügbare Adresse: 84.245.144.202
Broadcast-Adresse........: 84.245.144.203

Die Subnetze sind bereits auf dem Router konfiguriert und aktiv.

Die Adressen unserer DNS-Server lauten:

Primärer DNS-Server......: 212.202.215.1 (dns1.plusnet.de)
Sekundärer DNS-Server....: 212.202.215.2 (dns2.plusnet.de)

Sofern Sie von Plusnet einen OneAccess-Router erhalten haben, können Sie auch die IP-Adresse des Routers als DNS-Server verwenden. Der Router leitet die Anfragen an unsere DNS-Server weiter.

---end of the E-Mail excerpt ---

Due to technical reasons, not all IP addresse are available for free use. The above mentioned e-mail will specify the free IP addresses en detail. From these IP addresses you can chose the one(s) to be used with your PBX mediation server.

The (first) chosen IP address has to be entered in the SIP trunk order form in the field of the first fix IP address in the chapter "Technische Angaben". In the field of the optional second IP address the chosen IP address of an optional secondary PBX mediation server can be entered.

Please also send this SIP trunk order form to the Plusnet order management. Again you (precise the indicated technical contact person) will get automated e-mails with different confirmations like the SIP trunk activation confirmation and the location activation confirmations.

8.2 Functionality of the Plusnet Internet access The router of the Plusnet standard Internet access lines have four Ethernet ports which are marked with "Voice", "Option", Data" and "Backup" (in the case the marking will be like "E0" through "E3" the following rule applies: looking on the Ethernet sockets, the "Voice" port will always be on the right side).

Although the PBX mediation server can only be connected the Ethernet port marked "Data", all four ports will be described in the following text to give a complete understanding.

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8.1.1 "Voice" port of the Router

This port is configured to best work in conjunction with these Plusnet voice products:

— ISDN: IPfonie® Business, IPfonie® Corporate

— SIP: IPfonie® Basic, IPfonie® Extended, IPfonie® Extended Connect with registration mode

— PBX/Centrex: IPfonie® Centraflex, Tengo® Centraflex

The internet service is blocked on this port which can be used as a good protection against cyber attacks.

Each connected device gets one private IP address via DHCP which will be in the range of 10.255.1.1 till 10.255.1.229. The gateway address is 10.255.1.254.

For the transmission of IP packets from this port to the WAN the IP address(es) will be transformed from private to public with a standard NAT function. As SIP trunk with fix IP mode (peering mode) are not compatible with NAT, they cannot be connected to this Ethernet Port.

The standard "voice ready" function of the Plusnet internet access lines offers a bidirectional "strict priority queuing" of all VoIP packets from/to the Plusnet NGN, which assures a higher transmission priority for the VoIP packets than for all other service type IP packets. The only criteria which defines a VoIP packet is its source (for received packets) and destination (for packets to be send) IP address, that belongs to a Plusnet NGN component like a Plusnet SBC.

8.1.2 "Option" port of the Router

The Ethernet port is deactivated and reserved for future functions.

8.1.3 "Data" port of the Router

This port is pre-configured for general data applications like especially computers.

With the default functions of this port the connected devices will get one private IP address via DCCP in the range of 192.168.0.0 till 192.168.0.253. And the gateway IP address will be 192.168.0.254 and the broadcast IP address will be 192.168.0.255. Again, the transmission from the Ethernet port to the WAN will be done with NAT.

This will change, when a range of fix IP addresses has been ordered like described in the chapter 0 above: the private IP addresses will be omitted and a public IP subnet of the ordered size will be configured.

In the case a transfer network was ordered the private IP addresses will also be omitted, but a public transfer network will be assigned. A static route will route the actual public subnet to the free available address of the transfer network.

On the firewall the free address of the transfer network has to be assigned to the WAN interface and the actual public subnet to the DMZ. On the firewall an additional static default route to the IP address of the Router has to be installed within the transfer network. It is important not to enable any NAT in the transmission path!

This scenario and configuration is shown in Figure 8.

Again, the "voice ready" function of the Plusnet internet access lines is realized by a bidirectional "strict priority queuing" of all VoIP packets from/to the Plusnet NGN, which assures a higher transmission priority for the VoIP packets than for all other service type IP packets. The only criteria which defines a VoIP packet is its source (for received packets) and destination (for packets to be send) IP address, that belongs to a Plusnet NGN component like a Plusnet SBC. In conjunction with the SIP trunk these IP addresses belong to the subnets 213.148.136.0/23, 62.206.200.0/22 and 62.206.3.0/24. No other mechanisms like Diffserv/DSCP and CoS apply.

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8.1.4 "Backup" Port of the Router
This port is reserved for the connection of a backup modem or a redundancy router.

9. Network configuration

9.1 QoS
If additional, "competing" computer data is to be transferred on the data connections between your VoIP tele-phones or VoIP PBX and the NGN of Plusnet, the VoIP data must be **prioritised continuously** across the entire connection (i.e. also on the LAN, for example) using suitable Quality-of-Service (QoS) mechanisms.

Especially in conjunction with analogue fax group 3 the QoS gained even more importance recently: as not all other Internet Telephony Service Providers (ITSP) – like in particular the Deutsche Telekom – support the T.38 fax protocol and T.38 can´t be used in conjunction with the SIP trunk encryption, more and more the G.711 Pass-Through has to be used for the facsimile communication. With this "transparent mode" it is important, that no packet loss occurs over the complete transmission path to avoid any abortion of fax transfers.

Since this is a multifaceted subject, only some brief notes are listed below:

— Particularly at transfer points where the network bandwidth changes down, a QoS mechanism is essential. Such local bandwidth changes typically occur, for example, in location connections (Internet or IP VPN uplink).

— Network-based, bidirectional QoS mechanisms should be preferred to CPE-based mechanisms.

— In case of a Plusnet Internet link, a "voice-ready" line must be ordered, which prioritises VoIP data bidirectionally from and to the Plusnet-NGN with "strict priority queuing".

— In case of a Plusnet IP VPN link, the option "Class of Service" must be ordered, which allows up to six DiffServ-based service classes to be configured, allowing the required bandwidth for VoIP data to be protected in both directions.

— If DiffServ-based prioritisation is used, the VoIP UACs (e.g. VoIP telephones or the VoIP PBX) must mark the VoIP media data (preferably with a DiffServ value of 46 decimal) and the VoIP signalling data (preferably with a DiffServ value of 26 decimals, or alternatively 46 as well) with DiffServ, and no other network component must reset these values.

— The SBCs of Plusnet mark VoIP data with DiffServ (46 decimal) as well, but the values are maintained on the IP VPN only, not on Internet connections.

— In case the VoIP data of a Plusnet-SIP-Trunk are transmitted over a third party internet or VPN connection, the following mechanism can be used to prioritise the VoIP data going to the Plusnet NGN and coming from the Plusnet NGN: the IP subnets 213.148.136.0/23 and 62.206.200.0/22 (without encryption) and 62.206.3.0/24 (with the SIP trunk encryption option) can be used as source (for the downstream data) and destination (for the upstream data) addresses for this IP priorisation.

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10. Example of an Asterisk configuration

If your PBX is based on the open source software Asterisk, the following configuration example may be usefull for you in order to easily find your individual configuration of your PBX for the Plusnet SIP trunk IPfonie®. Extended Connect with registration.

```
;**********************************************************************************************************
;**********************************************************************************************************
;*      PLUSNET GmbH - Configuration Template for asterisk on IPfonie products with registration          *
;**********************************************************************************************************
;**********************************************************************************************************
;
;
; This config has been created by Plusnet GmbH for the Plusnet SIP trunk "IPfonie extended connect" in register mode
; The configuration is based on Asterisk Version 13.1x with sip.conf and extensions.conf.
;
; This template shows one solution that might help to implement asterisk on your own infrastructure.
; The shown parameters will help to do basic calls and additional features can be implemented separately.
;
; !!!!!!!!!!!!!!!!!! IMPORTANT !!!!!!!!!!!!!!!!!!!!!
;
; For your own securtiy and to avoid any abuse, please verify that your server, passwords and your access is restricted only for
; known users and the adresses you need.
;
;
; ***************** Notes *****************
;
; Replace "username" and "password" with the registration credentials of your SIP trunk account
; Remarks: the username contains the contract (CPE) number plus 4 additional random digits and
; the password has been pre-configured by the customer via the Plusnet customer web console.
;
; Syntax for specifying a SIP device in extensions.conf is
; SIP/devicename where devicename is defined in a section below.
;
; If you define a SIP proxy as a peer below, you may call
; SIP/proxyhostname/user or SIP/user@proxyhostname
; where the proxyhostname is defined in a section below
;
; Useful CLI commands to check peers/users:
;   sip show peers    Show all SIP peers (including friends)
;   sip show users    Show all SIP users (including friends)
;   sip show registry  Show status of hosts we register with
;
;   sip debug        Show all SIP messages
;
;
;
;
;**********************************************************************************************************




;**********************************************************************************************************
;**********************************************************************************************************
;**                      sip.conf  Part for Asterisk                          **
;**********************************************************************************************************
;**********************************************************************************************************


[general]
recordhistory=yes  ; Record SIP history by default (see sip history / sip no history)
limitonpeers=yes

realm=asterisk ; Realm for digest authentication
            ; defaults to "asterisk"
            ; Realms MUST be globally unique according to RFC 3261
            ; Set this to your host name or domain name
port=5060         ; UDP Port to bind to (SIP standard port is 5060)
bindaddr=0.0.0.0   ; IP address to bind to (0.0.0.0 binds to all)
srvlookup=yes     ; Enable DNS SRV lookups on outbound calls
            ; Note: Asterisk only uses the first host
            ; in SRV records
            ; Disabling DNS SRV lookups disables the
            ; ability to place SIP calls based on domain
            ; names to some other SIP users on the Internet
            ; and it disables the redundancy mechanism of the SIP trunk
            ;
insecure=port
Pedantic=yes      ; Enable slow, pedantic checking for Pingtel
disallow=all      ; First disallow all codecs
allow=g722:20
allow=alaw:20
```

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```
allow=ulaw:20     ; Allow codecs in order of preference and may be different depending on the used Codecs
allow=g729:20

language=de       ; Default language setting for all users/peers
nat=force_rport,comedia


;.*****************************************************************************************************************
;*  How to understand username and numberblock1base:                                            *
;*  xxxxxxyyyy@sipconnect -> "xxxxxx"="contract number"+"yyyy"="4 random digits"@sipconnect.ipfonie.de:password/numberblock1base  *
;*  numberblock1base = base number of number block 1, that is normally used.                      *
;*  0049 and geographic number without leading "0", e.g. "2216698000" but not "02216698000"           *          *
;*  You do not need extra registrations for every number.                          *
;.*****************************************************************************************************************


register => username@sipconnect.ipfonie.de:password@sipconnect.ipfonie.de/numberblock1base


;.*****************************************************************************************************************
;*  incoming Profile for sipconnect | one registration for all numbers that belongs to your account           *
;.*****************************************************************************************************************

[sipconnect.ipfonie.de-in]
;host=sipconnect.ipfonie.de
host=duro01.sipconnect.ipfonie.de
host=duro02.sipconnect.ipfonie.de
fromdomain=ipfonie.de
type=peer
context=incoming-sipconnect.ipfonie.de
insecure=invite,port
dtmfmode=rfc2833
canreinvite=no
nat=force_rport,comedia
disallow=all
allow=g722:20
allow=ulaw:20
allow=alaw:20
allow=g729:20


;.*****************************************************************************************************************
;*  outgoing Profile for sipconnect                                         *
;*  If you use more Numberranges or single numbers this part has to be duplicated and the names and numbers changed           *
;.*****************************************************************************************************************

[sipconnect.ipfonie.de-out]
host=sipconnect.ipfonie.de
;fromuser=numberblock1base
outboundproxy=sipconnect.ipfonie.de
context=outgoing
type=peer
insecure=invite,port
username=username
secret=password
nat=force_rport,comedia
dtmfmode=rfc2833
disallow=all
allow=g722:20
allow=ulaw:20
allow=alaw:20
allow=g729:20


;.*****************************************************************************************************************
;*  Internal User                                            *
;*  This internal User is only for some testing.                            *
;*  Please update the passwords to more complex values for your own safety to avoid abuse on your system!         *
;.*****************************************************************************************************************
[100]
type=friend
context=intern
secret=1234
language=de
host=dynamic
dtmfmode=inband
disallow=all
allow=g722:20
allow=ulaw:20
allow=alaw:20
allow=g729:20
nat=force_rport,comedia
dtmfmode=rfc2833
```

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```
;***************************************************************************************************************************
;***************************************************************************************************************************
;**                      extensions.conf  Part for Asterisk                          **
;***************************************************************************************************************************
;***************************************************************************************************************************
;*
;*          *
;* If you have additional numbers or numberranges you might adapt the "exten => _+49X." to the different numbers and ranges   *
;* to allow numbers that you need in your system.
;*                                                                                                       *
;* Example:
;*                                                                                                                        *
;* exten => _+492216698X.,1,NoOp
;*                                                                                               *
;* exten => _+492219876X.,1,NoOp
;*                                                                                               *
;* exten => _+492211234X.,1,NoOp
;*                                                                                               *
;*
;*          *
;* For incomming calls, you get all numbers that are assigned to your account with one registration!                     *
;*
;*          *
;* You do not need extra registrations for every number.
;*                                                             *
;*
;*          *
;***************************************************************************************************************************

[general]
static=yes

[intern]

include => incoming-sipconnect.ipfonie.de

;***************************************************************************************************************************
;*          Outgoing CALLS to Plusnet (number format and account information international without leading zero)        *
;*          Example for normal number presentation of an number range                               *
;*          Extension from telephone is added to the from field of the sip header                   *
;*          Called number is translated from e.g. 02216698000 to +492216698000                      *
;*          HINT: The CALLERID may be different and may contain less/more digits depending on the number range         *
;***************************************************************************************************************************
exten => _X.,1,SipAddHeader(P-Asserted-Identity: <sip:+49numberblock1base@sipconnect.ipfonie.de>)
exten => _X.,n,Set(CALLERID(all)=<+49numberblock1base${CALLERID(num)}>)
exten => _X.,n,Dial(SIP/"+49"${EXTEN:1}@sipconnect.ipfonie.de-out)
exten => _X.,n,Hangup


;***************************************************************************************************************************
;*          incoming  CALLS to Plusnet (number format and account information international without leading zero)        *
;***************************************************************************************************************************
;* aa = number digits to reduce from the left at the incoming base number before the number range starts              *
;*    example: +492216698xxx = 10 digits before the number range starts
;*                                                             *
;*
;*          *
;***************************************************************************************************************************
[incoming-sipconnect.ipfonie.de]

exten => _+49X.,1,NoOp
exten => _+49X.,n,Dial(SIP/${EXTEN:aa})
exten => _+49X.,n,Dial(SIP/100)
exten => _+49X.,n,Hangup
```

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11. Plusnet Support

IF YOU HAVE ANY ADDITIONAL QUESTIONS, PLEASE CONTACT THE BUSINESS CUSTOMER SERVICE HOTLINE AT THE FOLLOWING TOLL-FREE NUMBER: 0800 77 22 375 (CALLS FROM GERMANY ONLY)
E-Mail: business-support@plusnet.de

For any support contacts please prepare the following data: your company´s name, your Plusnet customer number and the contract number (CPE number) of your SIP trunk.

As any PBX certification for the Plusnet-SIP trunk is done by the manufacturer of the PBX himself, the Plusnet support does generally not know how to configure the specific PBX for the SIP trunk. This means you will have to obtain the installation guide of the PBX in any case and to follow precisely all given installation steps and details designated for the configuration of the Plusnet-SIP trunk respectively for SIPconnect 1.1. Be also sure to get support from the manufacturer of your PBX.

For PBX, which are not yet certified by the PBX manufacturer for the Plusnet-SIP trunk, the Plusnet support even can´t tell which functions like T.38 or CLIP no Screening are supported by the PBX.

Before contacting the Plusnet support you should follow all test and support possibilities of the PBX manufacturer. Please be aware, that in many cases not the PBX was configured wrong, but components in the transmission path, like firewalls, the switch infrastructure or the WAN router.

Did all PBX and IP debugging not lead to a solution, you can ask the Plusnet support to investigate the SIP protocol elements of your SIP trunk, which can reach the Plusnet systems i. e. the Plusnet SBCs.

As these Plusnet components have to handle many customer SIP trunks at the same time, a huge amount of trace data incurs on the side of Plusnet. To have a chance to find the received protocol elements of your PBX the Plusnet supports always needs the following data of a precise call attempt, which is not older than 6 hours:

— Calling party number

— Called party number

— Data and time of day of the call attempt

In the case also this protocol investigation of Plusnet does not lead to a solution e. g. because no protocol elements are reaching the Plusnet side, the next logical debugging step is to generate a local SIP protocol trace at the customer´s side. This can preferably be done as described below.

11.1   Logging with Wireshark

The most accurate and detailed information on the SIP protocol of your PBX system can be gathered with a trace on the IP network layer. As ubiquitously used and free of charge tool Plusnet suggest to use the Wireshark program. Traces of this program can be examined by the 3rd. level support of Plusnet to find any protocol error which also can point to the error reason.

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