Telenor SIP Trunk

Service description
Version 2.0.1

Contents

1 Abbreviations and definitions

The list below shows various definitions and abbreviations.

Abbreviation/definition	Explanation
SIP	Session Initiation Protocol – call control protocol used in VoIP. SIP is specified in RFC3261 and is a generic protocol for the control of multimedia sessions (e.g. telephony).
IAX2	Inter-Asterisk eXchange protocol, version 2.
TDM	Time Division Multiplexing – method used on PSTN/PLMN to collect calls on one line (e.g. 2 Mbit/s circuits).
VPN	Virtual Private Network. In this requirements specification the logical part of the IP network which is reserved for call traffic, as special quality requirements apply here.
ISUP	ISDN User Part. Call control protocol used in PSTN and PLMN.
iLBC	Internet Low Bit-rate Codec – a royalty-free call encoder specially developed for VoIP over the public internet.
G.711 A-law	(Used in Europe + the rest of the world). 64 kbit/s call + overhead = bandwidth 100 kbit/s pr. call channel.
G.711 µ-law	(Used in the USA and Japan). 64 kbit/s call + overhead = bandwidth 100 kbit/s per call channel. µ-law is not provided on Telenor SIP Trunk.
WAN	Wide Area Network
QoS	Quality of Service – prioritisation of call traffic
Nordic Connect	NC is Telenor's Nordic WAN product
CE	Customer Edge router – customer router
PE	Provider Edge router – network router
CLIP	Calling Line Identity Presentation (CLIP) – display of A number
CLIR	Calling Line Identification Restriction (CLIR) – no display of A number
MG	Telenor Media Gateway
LMA	Last Mile Access – customer access
PSTN	Public Switched Telephony Network
PLMN	Public Land Mobile Network
SBC	Session Border Controller
MSC	Mobile Switching Centre
MSS	MSC Server

The listed RFC can be found on IETF's website on the address:
http://www.ietf.org/rfc.html.

The listed G.711 codecs are standardised by ITU:
http://www.itu.int/ITU-T/publications/recs.html.

2 Telenor SIP Trunk – introduction

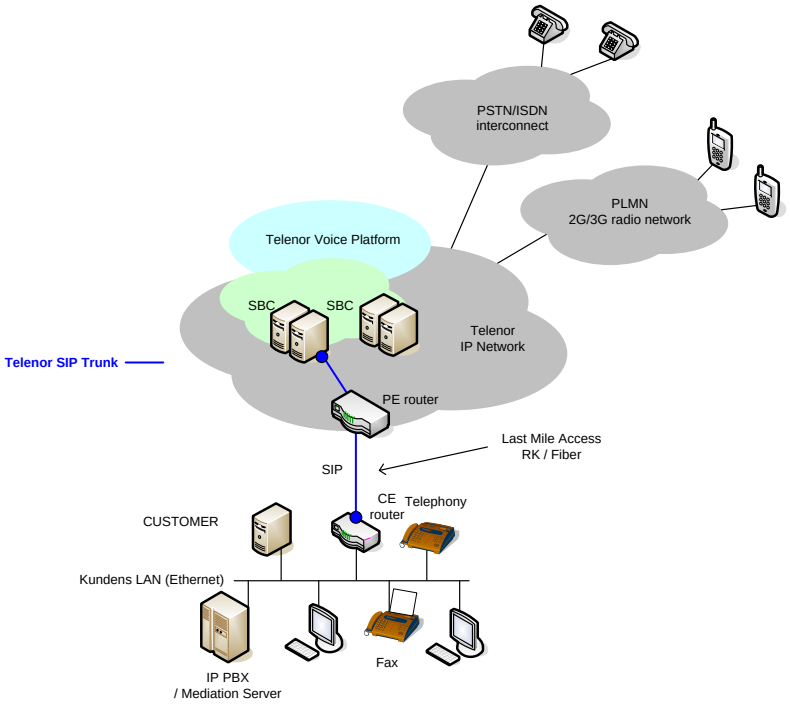
The Telenor SIP Trunk is an IP-based caller-line (trunk) for the company's switching system. The SIP Trunk is connected directly to an IP PBX or to a local network (the customer's LAN) where the customer's PBX is located. This allows the customer to run fixed-line call traffic via IP on the line.

A physical connection is established from the customer's location to a point in Telenor's network. The connection from the customer to Telenor is established on a radio connection or fibre. The SIP Trunk is established as a service on this connection and terminates in a router owned by Telenor (CE router) at the customer's location.

Telenor SIP Trunk is established with Quality of Service (QoS) which ensures that call traffic is prioritised over other data traffic.

A new number is allocated in Telenor's number range to the customer or the customer's existing numbers are ported to Telenor.

After this, it is possible to run incoming and outgoing fixed-line calls. Telenor SIP Trunk is delivered with up to 480 call channels (by-lines) as selected by the customer.



3 Certification

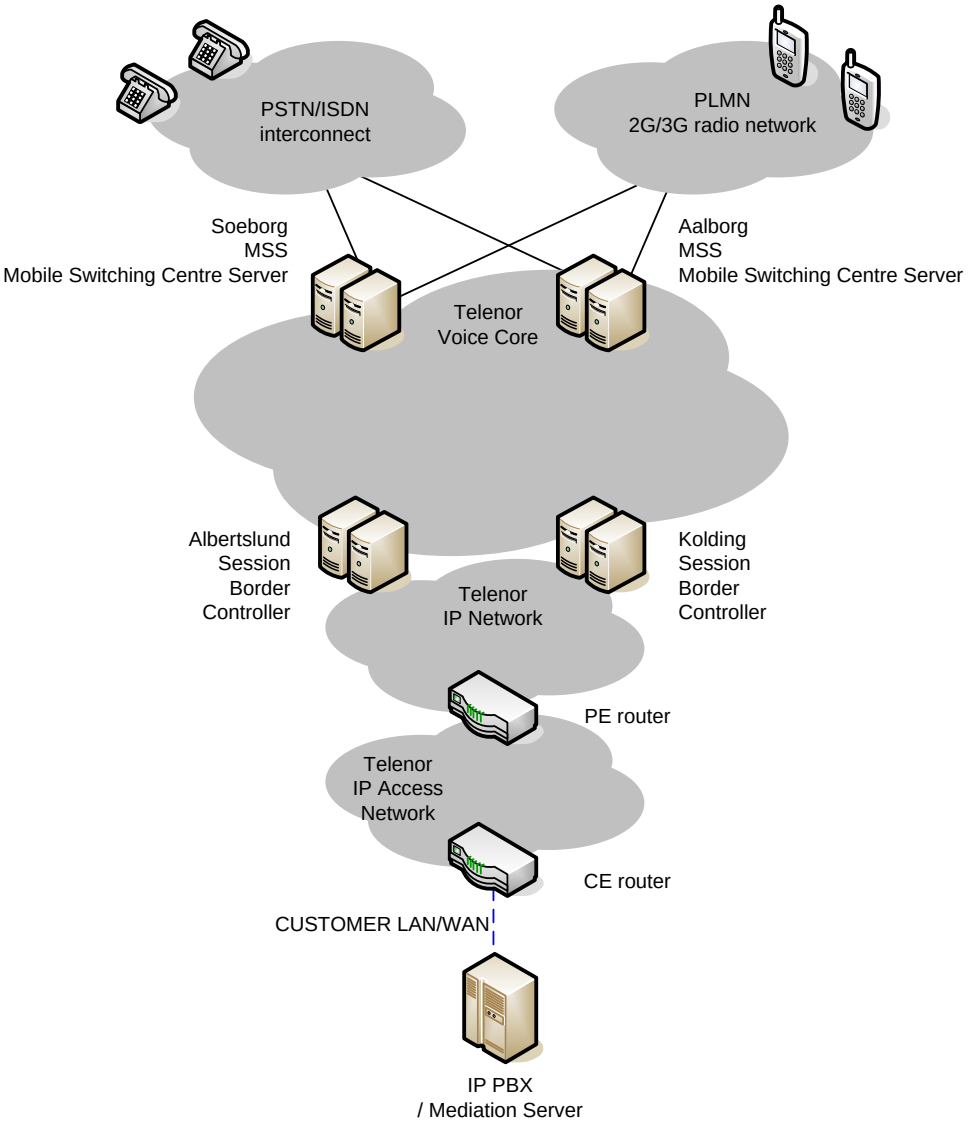
Telenor SIP Trunk is a Microsoft© Lync TM 2010 certified product. To obtain such certification, it has been verified that the SIP Trunk complies with a number of detailed test requirements and specifications defined by Microsoft.

The test requirements have been set up to ensure that the telecom providers comply with the requirements for interacting with Microsoft's unified communication solutions in a structured and supportable way.

Follow the link below to see a specification of all telecom providers certified with Microsoft Lync: http://technet.microsoft.com/en-us/lync/fp179863.aspx.

4 Network architecture

Below is shown a schematic diagram of the structure of Telenor's SIP Trunk platform.

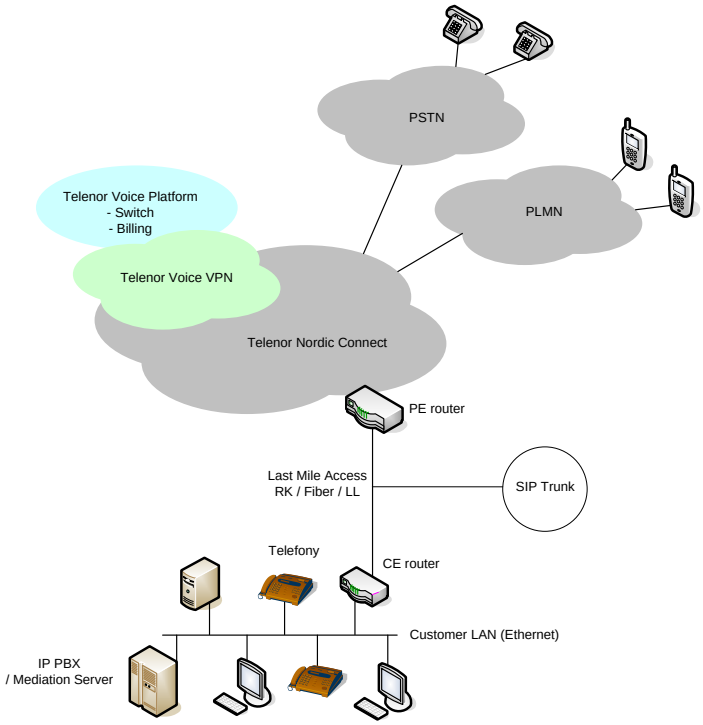


The SIP Trunk connection is connected to the customer's IP PBX, Microsoft Lync server environment or similar.

The customer directs outgoing traffic to Telenor, but keeps internal traffic between the telephones (IP telephones) and the PBX internally in the customer's own network. All outgoing traffic is delivered to Telenor. All incoming traffic from Telenor as well as other operators is received by the customer via Telenor, as the numbers belong either to Telenor's number series or have been imported to Telenor. Traffic is charged per minute at the prices listed from time to time.

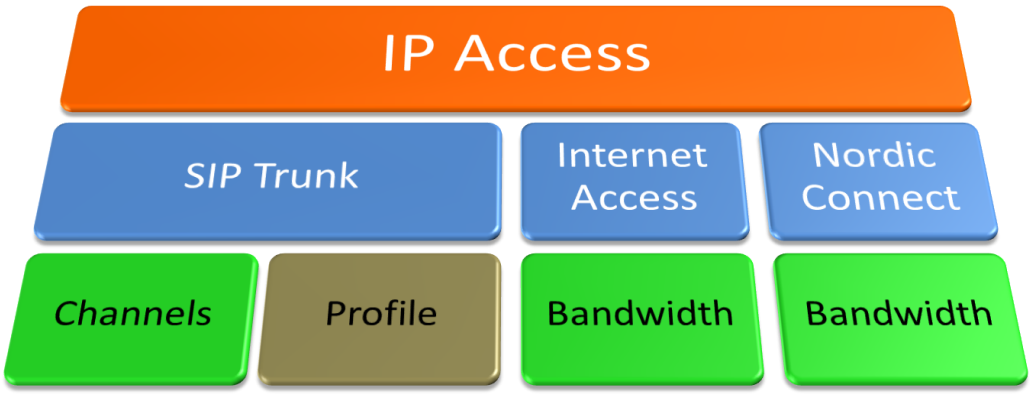
4.1 Interface between the customer's IP PBX and Telenor's telephony platform

Connection with Telenor's telephony platform supports protocols and codec in accordance with clauses 4.4 and 4.5 below.



The MPLS-based IP Access (the physical connection) supports multi-VPN so that Telenor SIP Trunk, WAN circuit and internet traffic can run over the same access. This saves equipment and installation costs and provides the customer with a financially attractive solution, making it possible to customise a flexible solution.

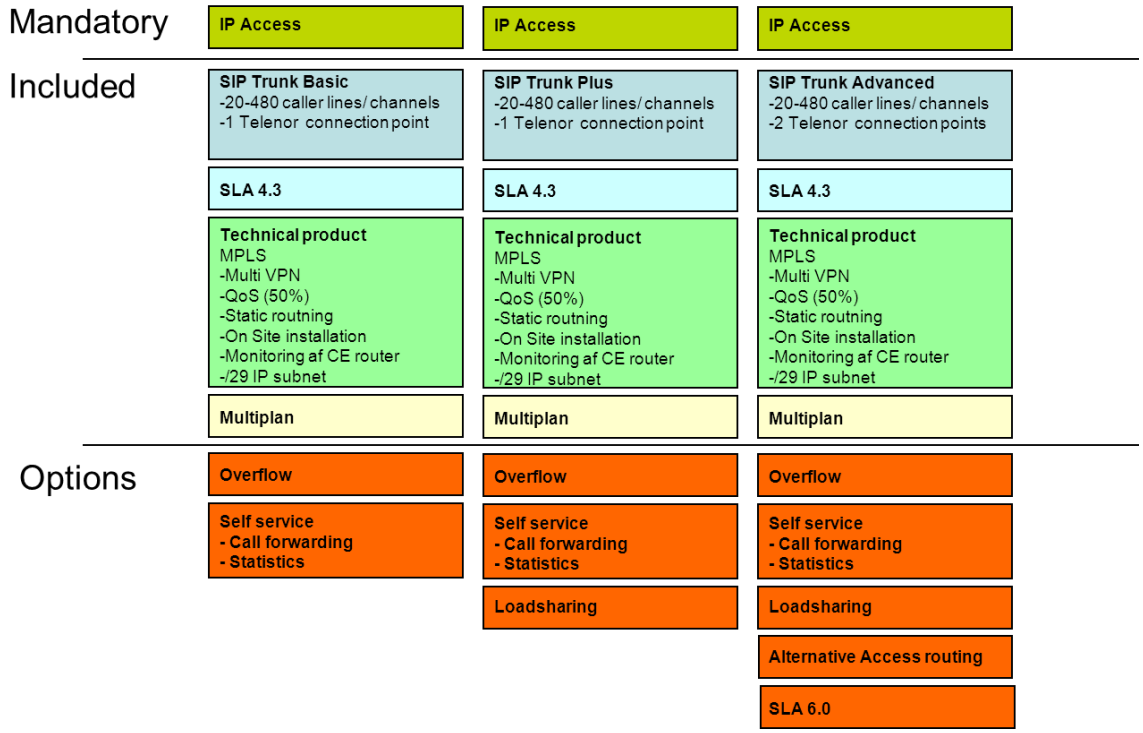
The products are structured as modules and have been optimised for routing via the same physical access as illustrated below:



5 Functionality

5.1 SIP Trunk product levels

The overview below shows Telenor SIP Trunk basic services and add-on products.



The SIP Trunk is established by default on a Telenor IP Access to ensure QoS.

The actual basic SIP Trunk service comprises a product profile (Basic, Plus or Advanced), a number of call channels (by-lines), 24-Hour service and an MPLS connection as a technical underlying product. Telenor Multiplan ExtensionPlan has been added by default.

The options for the individual product profiles depend on the network structures on which the profiles are based.

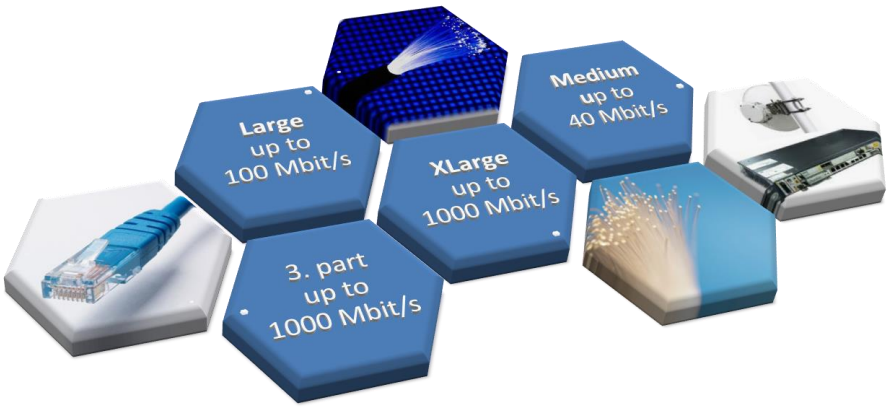
5.2 IP product structure

As mentioned in Clause 4.1, the SIP Trunk is delivered by default as a service on a Telenor IP Access.

The IP Access is available in various sizes, allowing it to be dimensioned according to the overall number of services to be delivered on the customer address. Only one IP Access is required to route multiple services such as calls, Internet and data.

5.3 SIP Trunk product variants, IP Access and third party access connections

The customer is free to choose the size of the IP Access based on the company's capacity requirement for the overall solution.



IP Access	Max. IP Access capacity
Medium	40 Mbit/s

Large	100 Mbit/s
XLarge	1000 Mbit/s
Third party access*	1000 Mbit/s

* Third party LMA routing to a customer location is possible, but Telenor recommends that Telenor IP Access is used to ensure the call quality (QoS).

The table below shows the connection between available SIP Trunk product variants and IP Access capacity.

Product variant	Number of call channels	Required BB [Mbit/s]*	QoS profile **	SIP Trunk minimum bandwidth on IP Access at 50% QoS*** [Mbit/s]	Recommended minimum IP Access	Remaining BB on minimum IP Access [Mbit/s]**	Other IP Access options
SIP Trunk 20	20	2	50%	4	M	36	L, XL
SIP Trunk 30	30	3	50%	6	M	34	L, XL
SIP Trunk 60	60	6	50%	12	M	28	L, XL
SIP Trunk 90	90	9	50%	18	M	22	L, XL
SIP Trunk 120	120	12	50%	24	M	16	L, XL
SIP Trunk 150	150	15	50%	30	M	10	L, XL
SIP Trunk 180	180	18	50%	36	M	4	L, XL
SIP Trunk 210	210	21	50%	42	L	48	XL
SIP Trunk 240	240	24	50%	48	L	52	XL
SIP Trunk 480	480	48	50%	96	L	4	XL

* One call channel requires 99.2 kbit/s.
**The remaining bandwidth on the IP Access can be used for Internet or WAN solutions.
*** The standard set-up is 50% QoS. This means that 50% of the minimum bandwidth on the connection is allocated for voice.

5.4 Third party routing (of end customer connection)

It is possible to select a third party LMA (other operator) for physical routing (internet or MPLS connection) of the SIP Trunk to Telenor, if applicable in combination with a hosted PBX functionality (physical routing to hosting partner).

5.5 Interface specification

The specification according to ITU-T/ETSI for the physical interface specification (socket type) is RJ45 Ethernet 100Base-TX or 1000Base-T or alternatively 1000Base-LX/LH or 1000BASE-SX.

5.6 Signalling protocols

The signalling protocol between the customer's IP PBX and Telenor's switch is SIP (RFC3261 IETF). Transport layer UDP.

5.7 Port set-up

The standard SIP Trunk port set-up is stated in the table below.

Type	Direction	Default MS Lync port set-up	Default IP PBX port set-up
SIP	Telenor to the customer	TCP default port 5060	UDP/TCP default port 5060
RTP	Telenor to the customer	UDP port range 16384-32768	UDP port range 16384-32768
SIP	The customer to Telenor	TCP default port 5060	UDP/TCP default port 5060
RTP	The customer to Telenor	UDP port range 16384-32768	UDP port range 16384-32768

The customer must ensure that any firewall has been opened for the Telenor host address and for UDP/TCP port 5060 to SIP & UDP port range 16384-32768 for RTP.

5.8 Call coding (codec) and conversion

Coded calls can be received in G.711 A-law. The sampling frequency is 8 kHz, resulting in a bit rate of 64 kbit/s (8 kHz sampling frequency x 8 bits per sample). The typical delay from the algorithm is 0.125 ms. Frame size is 20 ms.

5.9 Number format

Telenor sends and receives traffic to/from the customer ONLY in E.164 number format.

5.10 Number series and number porting

The customer can get a new number in the 72 series (Telenor's number range) or import its current number series to Telenor (via number porting). In the event of relocation at a later time, the customer's number series can be exported from Telenor to another operator.

5.11 Technical main number

The customer is allocated a technical main number in Telenor's systems. The technical main number is the customer's identification number throughout the customer process, and the customer's account will be invoiced for the subscription service with reference to this number.

5.12 Main number

The customer is registered with a main number as requested by the customer (a number from the customer's number series). If a call is made from the customer without an A number or with an A number that is not connected to the customer, the main number will be inserted as A number instead. The customer must select whether to display or hide the main number (CLIP/CLIR).

5.13 CLIP/CLIR

Number display is managed per call based on four criteria:

1. The submitted CLIR/CLIP information
2. CLIR/CLIP service codes (*31*/*33*)
3. The submitted A number
4. The set-up of Telenor SIP Trunk in relation to the main number and default number.

5.14 A# or B# display for outgoing calls

The customer must select whether to display:

1. Underlying numbers
2. Main number
3. Default number (not displayed for inactive A number)
4. Optional display A number – add-on service (charged to main number or underlying number)

5.15 A# or B# display for forwarded calls

The customer may select whether to display the original A number or B number in forwarded calls. The selection applies to all forwarded calls from the customer.

5.16 Alarm calls

Together with Telenor, the customer must determine how to direct calls to the alarm network. Reference is also made to document NYS-1055 on *direction of alarm calls*. The customer is responsible for ensuring that Telenor is given the correct information regarding the 112 emergency alarm service/the 118 telephone directory service.

To do this, the customer must complete form no. NYS-027 on registration of customer information on the 118 telephone directory service.

The form ensures that the customer's number and address data are available on 118 and 118 Online. Information from the 118 telephone directory service is used e.g. to direct 112 emergency alarm calls and is therefore very important.

Telenor submits electronically updated data to TDC each night but Saturday night.

TDC handles data which are available on both 118 and 118 Online the next weekday. Accordingly, any changes made by Telenor on Mondays are available on 118 on Wednesdays, and changes agreed on Thursdays are available on Mondays.

Telenor does not transfer data to Krak and Eniro.

NOTE – if Telenor does not receive this appendix with correctly completed contact information, the customer's invoice address will be registered with the main number on the 118 telephone directory service and it is therefore not possible to determine the correct location in the event of emergencies.

5.17 SIP options

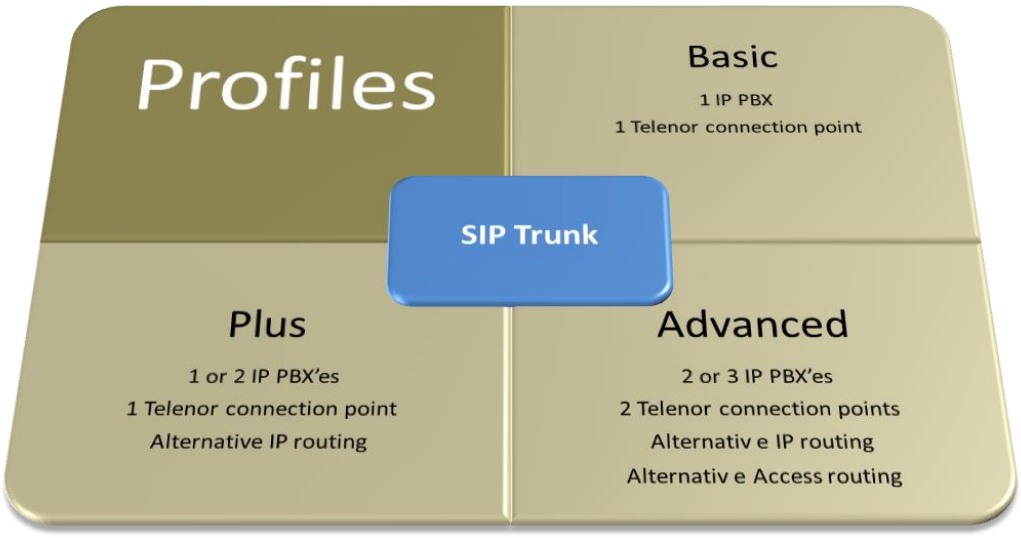
The customer's PBX/server environment must support SIP Options ping to ensure that lacking connectivity is detected. Used e.g. to activate overflow function.

5.18 DTMF toner

DTMF toner according to RFC 2833.

5.19 Delivery specification

As a default delivery, Telenor SIP Trunk is specified on the basis of a set of product profiles that partly specify how Telenor delivers the product and partly how the customer adjusts its set-up. The product profiles are shown below.



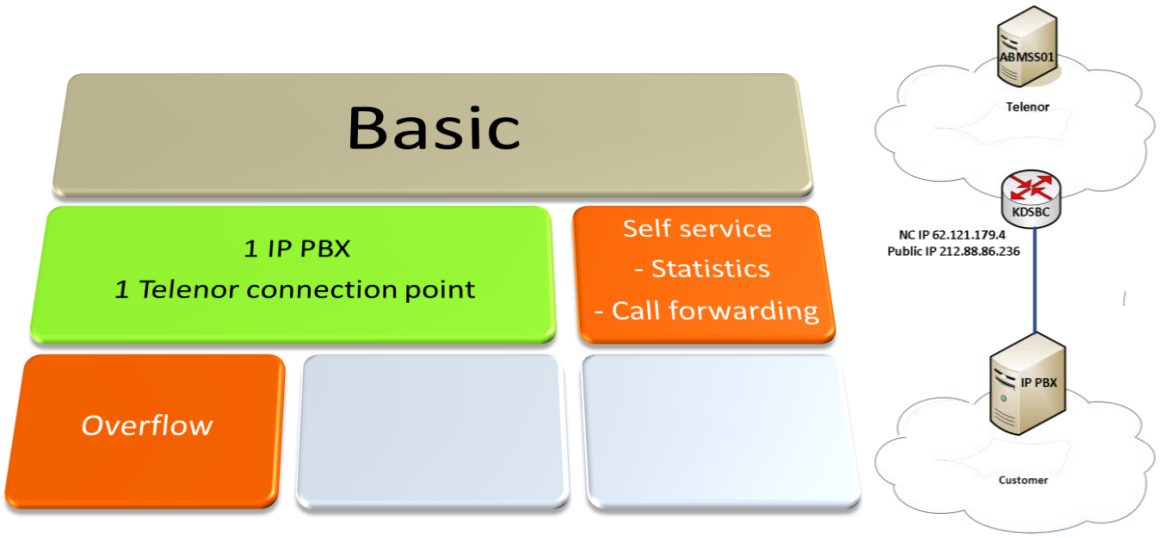
5.20 Product profiles

The product profiles give an overall description of the technical set-up options in the products and the available add-on options.

If an additional functionality which is not available on the selected product profile is requested, it is possible to upgrade to another profile. The product profiles target various network architectures/customer solution types with Basic being the simplest profile with the fewest set-up and add-on options and Advanced being the advanced network topology profile.

The Basic, Plus and Advanced product profiles are shown below.

5.21 Product profile – Basic



The Basic product profile is the simplest set-up option in the SIP Trunk product. The SIP Trunk is set up using one connection point to Telenor, one fixed IP-PBX Host IP address and a fixed port.

The account is set to NO authorisation on a call basis (RFC3310).

Telenor will send the SIP & RTP traffic to the fixed IP-PBX Host address.

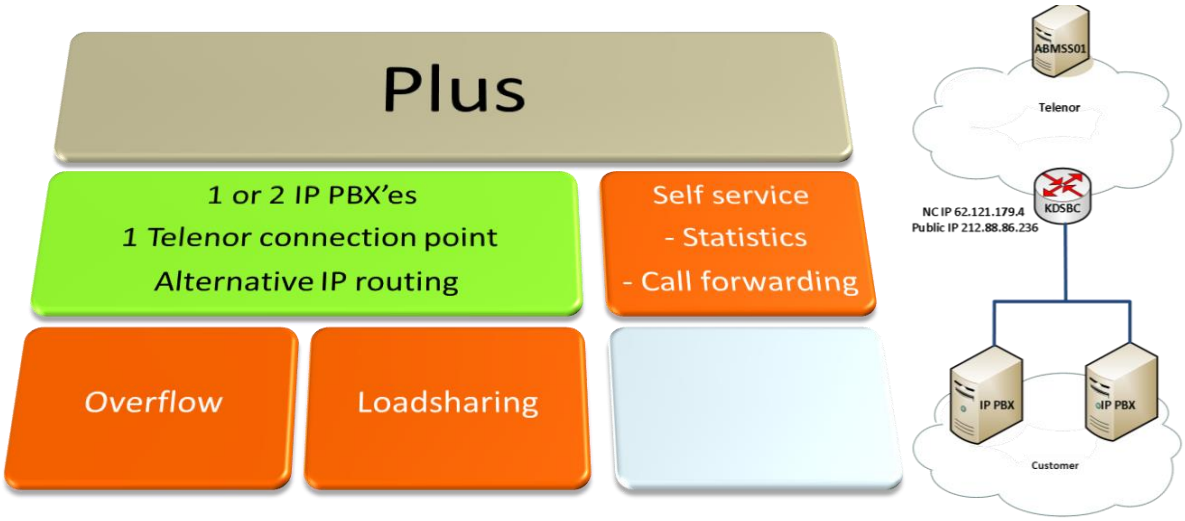
Registration attempts from the IP-PBX (via the REGISTER method) will be rejected by Telenor and therefore fail.

Only SIP traffic on the customer's SIP Trunk account from the allocated fixed IP address will be accepted.

Overflow
It is possible to select overflow for one or more telephone numbers. Overflow numbers can be Telenor mobile numbers or national fixed-line numbers. A maximum of 10 overflow numbers can be set up.

Self-Service
It is possible to select a Self-Service module that gives access to the forwarding functionality on a single number level and traffic statistics on the line. The Self-Service module will be available in MultiPlan Self-Service.
Self-Service log-in requires a user name and a password.

5.22 Product profile – Plus



With the Plus product profile, the SIP Trunk is set up using one connection point to Telenor, two fixed IP-PBX Host IP addresses and a fixed port.

The account is set to NO authorisation on a call basis (RFC3310).

Telenor will send the SIP & RTP traffic to the fixed IP-PBX Host addresses.

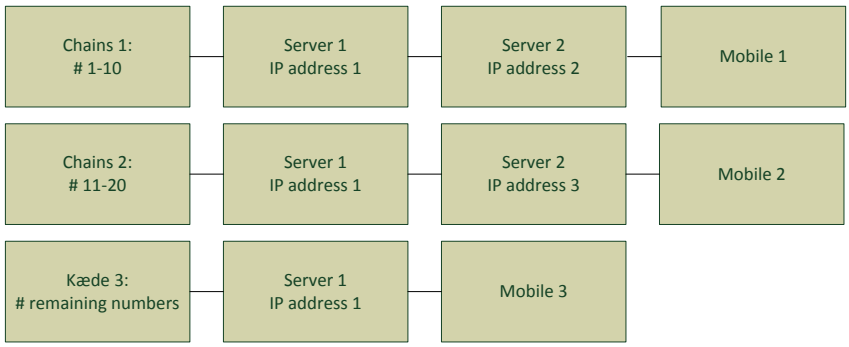
Registration attempts from the IP-PBX (via the REGISTER method) will be rejected by Telenor and therefore fail.

Only SIP traffic on the customer's SIP Trunk account from the allocated fixed IP address will be accepted.

Overflow
It is possible to make overflow to other IP PBXs or to a telephone number. Overflow numbers can be Telenor mobile numbers or national fixed-line numbers. A maximum of 10 overflow numbers/chains can be set up.

With overflow, the company ensures that incoming calls are forwarded and are not lost in the event of breakdowns or in peak load situations.

An example of a 100 number series set-up could be as follows:



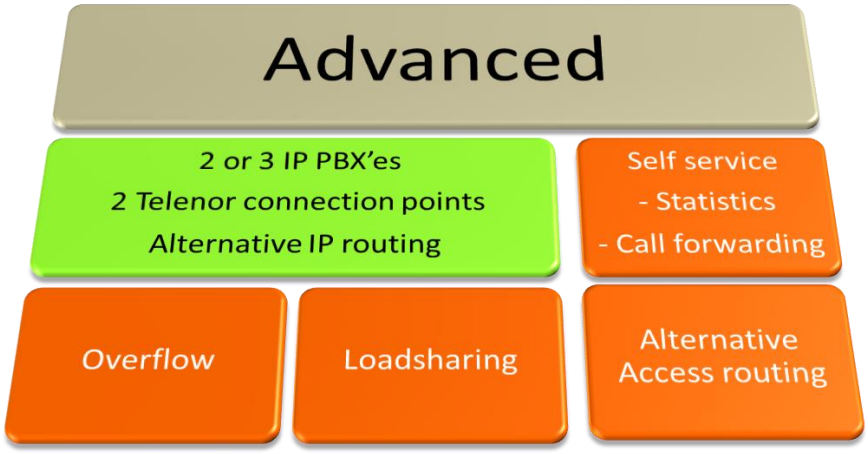
Load sharing
Telenor SIP Trunk makes load sharing of traffic on the company's telephony possible. Load sharing is set up using percentage traffic distribution.

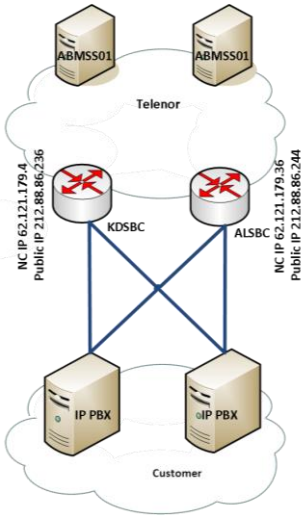
It is possible to distribute incoming calls between a number of IP addresses, thereby ensuring that important calls are not lost in the event of breakdown or in peak load situations.

Load sharing requires a minimum of two IP PBXs at the customer's location.

Self-Service
It is possible to select a Self-Service module that gives access to the forwarding functionality on a single number level and traffic statistics on the line. The Self-Service module will be available in MultiPlan Self-Service. Self-Service log-in requires a user name and a password.

5.23 Product profile – Advanced





With the Advanced product profile, the SIP Trunk is set up using two connection points to Telenor, two or three fixed IP-PBX Host IP addresses and a fixed port.

The account is set to NO authorisation on a call basis (RFC3310).

Telenor will send the SIP & RTP traffic to the fixed IP-PBX Host addresses.

Registration attempts from the IP-PBX (via the REGISTER method) will be rejected by Telenor and therefore fail.

Only SIP traffic on the customer's SIP Trunk account from the allocated fixed IP addresses will be accepted.

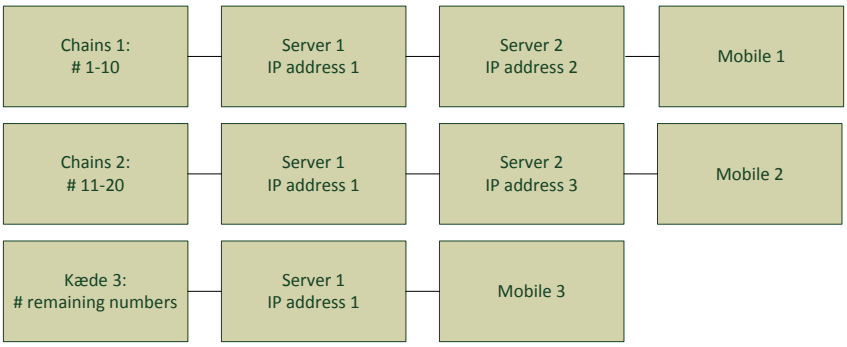
More connection points
Outgoing calls can be routed to two different connection points in Telenor's network (geographically separate).

Each of Telenor's connection points are independently redundant but in case of an accident, routing with two connection points will protect the company against further breakdowns in Telenor's infrastructure.

Overflow
It is possible to make overflow to other IP PBXs or to a telephone number. Overflow numbers can be Telenor mobile numbers or national fixed-line numbers. A maximum of 10 overflow numbers/chains can be set up.

With overflow, the company ensures that incoming calls are forwarded and are not lost in the event of breakdowns or in peak load situations.

An example of a 100 number series set-up could be as follows:



Load sharing
Telenor SIP Trunk makes load sharing of traffic on the company's telephony possible. Load sharing is set up using percentage traffic distribution.

It is possible to distribute incoming calls between a number of IP addresses, thereby ensuring that important calls are not lost in the event of breakdown or in peak load situations.

Load sharing requires a minimum of two IP PBXs at the customer's location.

Self-Service
It is possible to purchase a Self-Service module that gives access to the forwarding functionality on a single number level and traffic statistics on the line. The Self-Service module will be available in MultiPlan Self-Service. Self-Service log-in requires a user name and a password.

Alternative access routing
It is possible to purchase alternative access routing for the SIP Trunk Advanced profile.

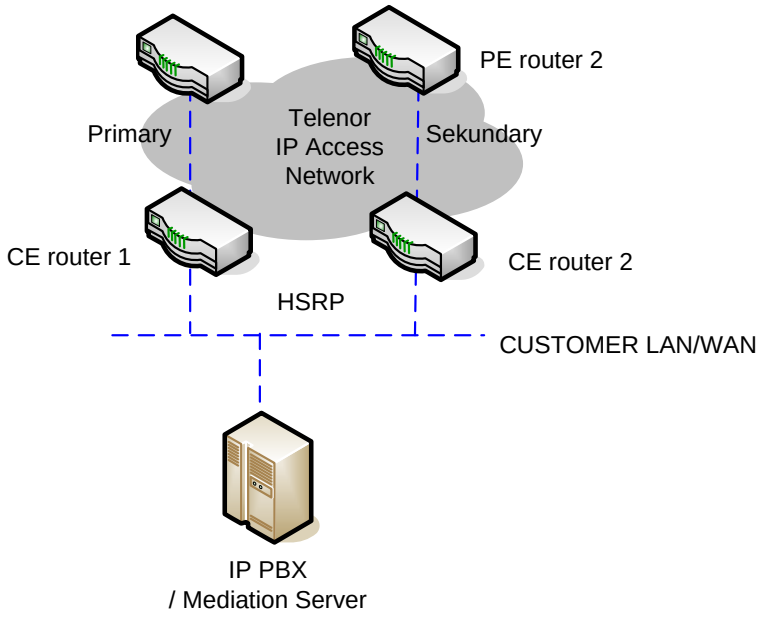
This solution gives the company a high degree of protection against a loss of connection to the surrounding world in the event of a breakdown in the actual connection.

For alternative routing, two accesses to the customer's address are set up and routed using different routes and in certain cases using different routing methods.

Alternative routing is set up as active-passive with automatic failover.

One connection is defined as the primary (active) connection whereas the other connection is the secondary (passive) one. The below example uses HSRP signalling to control failover between the access connections, and the two CE routers must be connected via an Ethernet LAN. VLAN 17 on LAN port 1 on the CE router is reserved for that purpose, and the customer must switch VLAN 17 traffic in its local network to ensure connectivity between the CE routers.

During normal operation, data traffic runs over the primary connection while the secondary connection is in passive standby. In the event of a fault in the primary connection, data traffic is redirected and the secondary connection becomes the active one. MGP is the routing protocol used to control rerouting, and the maximum rerouting time is three minutes. When the fault has been corrected, the primary connection once again becomes active, and data traffic will once again be redirected.



It is also possible to use BGP instead of HSRP where the customer is responsible for failover between the two CE routers.

If full redundancy is requested, the customer must ensure that a 230V backup power supply is available for Telenor's CE routers as well as the customer's other equipment.

6 Transmission forms

Depending on the customer's location and physical conditions, Telenor uses different transmission forms to route Telenor SIP Trunk to the customer's location. A radio link connection or fibre is used to the nearest access point in Telenor's telecommunication network. The choice of transmission form is made on the basis of an inspection.

The different transmission forms involve different installation and cabling requirements.

Radio link solution
An antenna (dish) is installed on the customer's building, and cables are routed from this antenna to Telenor's network termination equipment.

Fibre solution
A fibre cable is installed from the company to Telenor's network.

This requires that fibre cables are buried on the company's land and that a hole is drilled to lead a cable into the building.

Installation
Telenor will strive to work out an agreement with the customer on the location of equipment and cabling in the company within 14 days of the conclusion of the agreement. This work will be performed at Telenor's account. This requires, however, that the customer makes existing routings available free of charge to Telenor. Special requests for the location of routings or equipment that involve extra costs are for the customer's own account.

For radio link solutions, a cabinet is installed as Telenor's network termination unit. Mechanical dimensions and weight can be seen in the technical specifications.
The other solutions involve other types of equipment that generally require less room than the cabinet.

Removal of equipment
In the event of removal of Telenor's equipment, reestablishment is made solely for the customer's account.

6.1 Transfer

Transfers will be handled and invoiced as new establishments. Telenor SIP Trunk can only be transferred to locations where Telenor can deliver. Telenor does not transfer the service unless requested by the customer.

7 Delivery

7.1 Connection to Telenor's network

Telenor is responsible for terminating the IP access connection in the first cross-field at the customer's location. The customer must specify the location of this termination point together with Telenor and is furthermore responsible for ensuring that Telenor's technicians have access to the premises in which the installation will be carried out during the actual installation. The CPE delivered by Telenor should be placed according to the customer's instructions.

7.2 Delivery point

If the customer selects a different or inappropriate location for the termination point and the delivery point, internal cabling may be required. The internal cabling is not included in the service, and the customer bears the costs of this.

The customer may select the cable to be used by Telenor for the installation. Provided that the internal cabling meets Telenor's conditions, Telenor will complete the installation. If the

customer does not select internal cabling or if it does not meet Telenor's conditions, the installation of the service will be postponed until this is in place.

Upon request, Telenor may ask an external supplier to carry out the internal cabling. Payment for such a service is handled separately by the customer and the supplier.

7.3 Space requirement for CE router installation

- The room must be at least 1 x 1 x 1 m.
- The CE router must be placed on the customer's property.
- No third parties may be given access to the location.
- Telenor must be able to access the location in the event of fault handling.
- The location must have a constant temperature and a relative humidity (23° C ± 5° C, 10-80% relative humidity, non-condensing temperature range).
- It is recommended to use fault-tolerant power supply.
- The customer must ensure that a 230V power supply is available for the CE router and any other transmission equipment.

7.4 Local Area Network (LAN)

The customer is responsible for the LAN network and all equipment used for it. If the customer uses a firewall, the customer is responsible for NAT'ing IP addresses between the IP addresses allocated by Telenor and the customer's own private IP addresses.

Telenor recommends that the customer's LAN is based on category 5 cabling or higher to ensure the best possible quality.

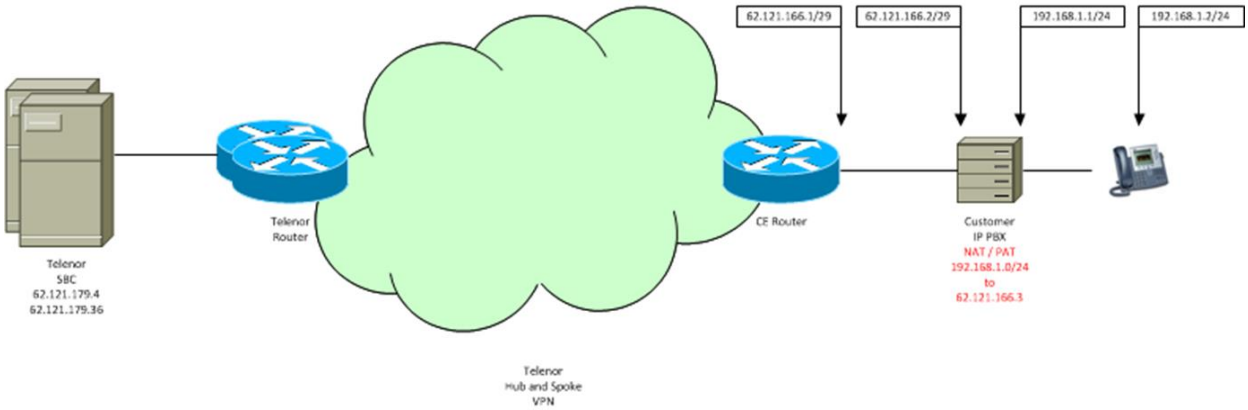
SIP Trunk and IP PBX

Telenor delivers the CE router with a public /29 network on the LAN interface.

The customer's IP PBX must handle NAT/PAT of the 192.168.1.0/24 network, as only the 62.121.166.0/29 network is routed in Telenor's Hub and Spoke VPN. Telenor's VPN is established as Hub and Spoke to ensure the customer's discretion.

The customer's IP PBX must be able to handle NAT/PAT of 50 packages per second per conversation.

The 62.121.166.0/29 and 192.168.1.0/24 networks below are merely examples.



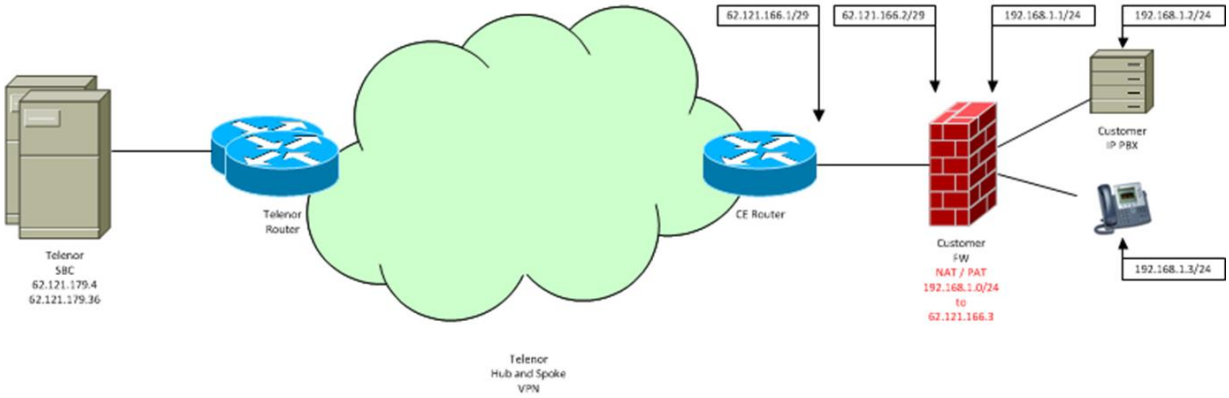
SIP Trunk firewall and IP PBX

Telenor delivers the CE router with a public /29 network on the LAN interface.

The customer's firewall must handle NAT/PAT of the 192.168.1.0/24 network, as only the 62.121.166.0/29 network is routed in Telenor's Hub and Spoke VPN. Telenor's VPN is established as Hub and Spoke to ensure the customer's discretion.

The customer's firewall must be able to handle NAT/PAT of 50 packages per second per conversation.

The 62.121.166.0/29 and 192.168.1.0/24 networks below are merely examples.



7.5 IP addresses

A /29 subnet is reserved for the Telenor SIP Trunk product per customer solution and the addresses are set up according to the principle below. The IP addresses are distributed based on the product profiles and may be either allocated (green), reserved (yellow) or unavailable (red) for the relevant profiles.

SIP Trunk IP Address Overview
Ex. 62.172.10.96/29 – 255.255.255.248

IP Adresser:		62.172.10.96	62.172.10.97	62.170.10.98	62.170.10.99	62.170.10.100	62.170.10.101	62.170.10.102	62.170.10.103
	Redundancy type	Network	Telenor CE router Primary	Telenor CE Router Redundant	HSRP Address	Customer PBX/Lync No 1	Customer PBX/Lync No 2	Customer PBX/Lync No 3	Broadcast
Basic	Not Possible	62.172.10.96	62.172.10.97 "GATEWAY"	62.172.10.98 Reserved for Redundancy	62.172.10.99 Reserved for HSRP	62.172.10.100	62.172.10.101 Max 1 PBX/Lync	62.172.10.102 Max 1 PBX/Lync	62.172.10.103
Plus	Not Possible	62.172.10.96	62.172.10.97 "GATEWAY"	62.172.10.98 Reserved for Redundancy	62.172.10.99 Reserved for HSRP	62.172.10.100	62.172.10.101	62.172.10.102 Max 1 PBX/Lync	62.172.10.103
Adv.	BGP	62.172.10.96	62.172.10.97 "GATEWAY"	62.172.10.98 "GATEWAY"	62.172.10.99 Reserved for HSRP	62.172.10.100	62.172.10.101	62.172.10.102	62.172.10.103
Adv.	HSRP	62.172.10.96	62.172.10.97	62.172.10.98	62.172.10.99 "GATEWAY"	62.172.10.100	62.172.10.101	62.172.10.102	62.172.10.103

7.6 Telenor host IP address

Depending on the product profile selected, the customer may choose between one or two connection points to Telenor and based on this selection, the customer will receive one or two Telenor host IP addresses to be implemented in the customer's solution. In future, the customer will send traffic to this/these host IP address(es) and also receive traffic from this/these. The customer must therefore ensure that any firewalls are open for traffic to/from these IP addresses.

7.7 Delivery confirmation

The installation of a Telenor SIP Trunk will always be followed up by a final test to document that the connection works as intended. The test comprises the following checks:

- Bandwidth test
- Redundancy test
  - IP redundancy (test of overflow/load sharing)
  - Alternative access routing
- Call test
  - To mobile, fixed-line, international, emergency, incoming calls
- Load test (traffic load)

The test result is documented in a report that is given to the customer. When the line is reported ready, the customer has 10 days to submit a complaint for defective delivery, after which time the line is considered to have been put into service with the customer's accept.

8 SLA

The SLA for Telenor SIP Trunk is described in the document NYS-247 *Telenor SIP Trunk Service Level Agreement*.

Telenor SIP Trunk has SLA level 4.3 by default.

The connection is monitored remotely 24 hours, 365 days a year for faults until the network termination (the CE router).

Faults must be reported to Telenor Front Office, available 24/7. Telenor will start critical fault repair as soon as possible after having received the fault report, but no later than after four hours.

The fault will be repaired as soon as possible. In the event that fault location and repair requires a visit from a technician at the installation address, the fault repair requires that Telenor's technician has access to Telenor's equipment, including after normal working hours.

Telenor's Service Level Agreement defines information on fault levels, repair times and warning times etc. in detail.

The customer's technical staff may register for an e-mail/SMS service to receive operating status reports in the event of breakdowns and planned interruptions.

By choosing the Advanced profile and SLA level 6.0, it is possible to obtain higher availability, as this Advanced profile allows redundant solutions. Please note that technical requirements apply to Advanced.

Note – if Telenor does not deliver the end customer connection (Telenor IP Access), Telenor cannot guarantee uptime and the experienced/measured call quality at the end customer's location.

The quality of a SIP Trunk routed via third party routing will be considered as Best Effort.

It is not possible to purchase SLA 4.3 and SLA 6.0 from Telenor for third party routing.

SIP Trunk service level overview		
Service level	4.3 (24-Hour service)	6.0 (24-Hour service)
Service time	All days, 24 hours	All days, 24 hours
Physical fix time	< 8 hours	< 8 hours
Remote fix time	< 4 hours	< 4 hours
Availability per month	99.6%	99.9%
Automatic failover time	No	> 3 min.
Outgoing call success ratio	99%	99%
Correctly ended outgoing call	99%	99%
Fault reporting time	All days, 24 hours	All days, 24 hours
Response time	< 20 sec. Telephone, < 30 min. E-mail	< 20 sec. Telephone, < 30 min. E-mail
Technical requirements	None	See the SLA description for detailed specification of technical requirements.

9 Matching of expectations and set-up guide

To ensure successful installation of the SIP Trunk, a document has been prepared, NYS-321, which described the process and the distribution of responsibilities throughout the delivery process until and including the line operation. Understanding and relating to this document is an important precondition for successful delivery. The document is part of the standard documentation that the customer will receive before the line is installed.

Before the line is reported to be ready, the customer will receive a set-up guide to ensure correct set-up of the PBX/server environment. This guide comprises information on IP addresses, port set-up etc. Telenor is not responsible for setting up the customer's LAN, FW etc.

To ensure correct set-up of Caller Display and invoicing, the customer will receive a document that describes the options supported by the Telenor SIP Trunk.

10 Multiplan

Telenor's Multiplan functionality (ExtensionPlan) is imposed by default.