TELE GREENLAND A/S
(Referred to as TELE-POST)

Wholesale Data Services

Annex C6

National IP Service

Service Description

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Abbreviations

Abbreviation	Description
ASN	Autonomous System Number
BGP	Border Gateway Protocol
EBGP	External BGP
CPE	Customer Premises Equipment
IP	Internet Protocol
L2	Layer 2
L3	Layer 3
L2VPN	Layer 2 VPN
L3VPN	Layer 3 VPN
NTP	Network Termination Point
PoP	Point of Presence
QoS	Quality of Service
TPID	Tag Protocol Identifier
VPN	Virtual Private Network

1. Introduction

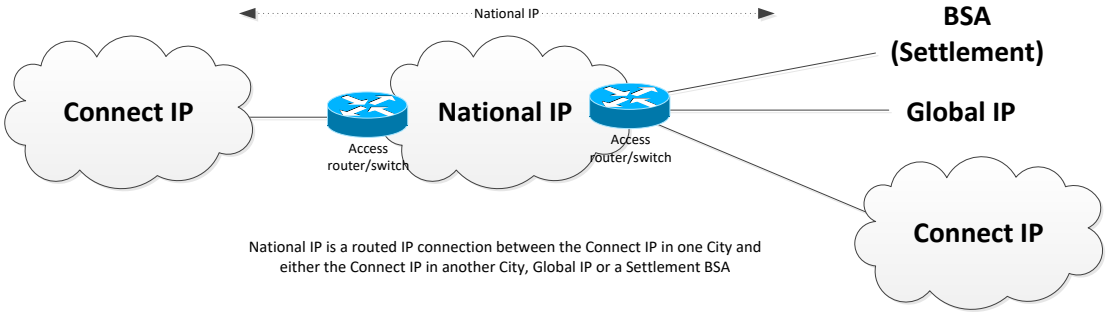
This Annex defines the National IP Service.

The processes and technical information to support the implementation of this Service are described in the Operations & Maintenance Manual (Annex E6 of this Agreement) and Technical Description (Annex D6 of this Agreement).

All equipment and plant that is deployed as part of the implementation of this Service shall comply with relevant national and international standards.

All installation procedures used must comply with standard industry practices and national and international standards.

The various Service elements and their relationships are described in more detail in the Technical Description for the National IP, Annex D6 of this Agreement.



2. Service Description

The National IP Service enables Service Taker to create interconnectivity between all Service Taker's Connect IP Services, in any and all cities, between Service Taker's connect IP Service in any city and BSA Services in associated settlements and between Service Taker's connect IP Service in Nuuk and the global IP Service.

Charges are based on Capacity.

The National IP charges apply to capacity usage between all Service Taker's Connect IP Services, in any and all cities, between Service Taker's connect IP Service in any city and between BSA Services in associated settlements and between Service Taker's connect IP Service in Nuuk and the Global IP Service.

The National IP Service is an optional part of the complete wholesale portfolio which enables a Service Taker to provide IP-based services such as Internet access.

The National IP Service consists of the following elements in TELE-POST's Network:

- Creation of Service Taker capacity in TELE-POST transmission Network connecting TELE-POST PoPs nationwide in Greenland, using microwave, or submarine cable, as per TELE-POST Network topology.

- The Service Taker must purchase a Connect IP Service in each city where the Service is wanted.

3. Geographic Availability

Only one National IP Transit Service is required to cover all TELE-POST PoPs.

4. Service Demarcation

The National IP Service is defined as a logical Network entity in TELE-POST's Network, to which any and all of the Service Taker's Connect IP Services can be connected.

5. Quality Criteria

TELE-POST commits to an uptime criterion of 99.6% for the National IP Service.

6. Chargeable Service Activities

The applicable charges for the Service described in this Annex are listed in the Price List Annex contained at Annex G of this agreement.

The Service Taker will be charged for service activities such as:

- Setup charge
  - A one-off charge for the initial provision of the National IP Service.
- Monthly recurring charges
  - CDR
    - To use the TELE-POST National IP Service, the Service Taker must purchase a minimum Network wide Capacity. The CDR is specified in the Order Form and is the minimum amount of Capacity that will be charged to Service Taker each month, even if not fully used by Service Taker. The minimum CDR subscription charge is equivalent to the CDR for Global IP if the Global IP service is subscribed.
  - Burst surcharge (Not guaranteed)
    - The Service Taker will pay a surcharge on top of the CDR price for the amount of Capacity consumed above the CDR (BDR). TELE-POST cannot guarantee the availability of BDR Capacity at all times. The minimum BDR usage charge is equivalent to the BDR for Global IP if the Global IP service is subscribed.
  - Network Priority Charge
    - The Service Taker may subscribe to prioritization of a share of the available National IP capacity in case of Network degradation such as, but not limited to, failure of the Microwave links or the Submarine cables, by subscribing to Network Priority.
    - The Priority Share of National IP capacity available to each Service Taker, in case of Network degradation is allocated proportionally to the Service Takers subscription to Network Priority and the actual used capacity, within the impacted area, during the previous month.
    - The subscription to Network Priority is optional.
    - Subscription to Network Priority may exceed the National IP Service CDR subscribed if available, i.e. total CDR for all operators is not exceeded.
    - The Priority Share is calculated across all NIP services subscribed by the same juridical entity.
    - The Priority share cannot exceed the actual 95th percentile usage for the previous month.
    - Any capacity available in excess of the aggregate Priority Shares will be available to other services on a best effort scheme.
- Service change charge

- A one-off charge per incident of service change on National IP Service

- Termination charge
  - A one-off charge for the cessation of the National IP Service.

- Testing Resulting in "Fault not Found"
  - If a fault is reported by a Service Taker regarding a National IP Service and when that National IP Service is tested by TELE-POST the National IP Service is found to meet, or exceed, the specifications detailed in Annex E6 of this agreement, a "Fault Not Found" result would be deemed as the result. In that case, TELE-POST will charge the Service Taker for the test as indicated under the item "Fault Not Found fee" in the Price List Annex at Annex G of this Agreement.
  - Where a fault condition continues to exist, the Service Taker may request additional testing to seek to establish the cause of the fault. Charges for this additional testing shall be based on the additional work performed as a result of the request. The process for tackling fault reports is described in the Operations & Maintenance Manual at Annex E6 of this Agreement.

- Cancellation of an order for National IP Service
  - If at any stage in the provisioning process (after receipt of order and before completion of delivery of the National IP Service) Service Taker withdraws its order for the National IP Service, the Operator will be charged the full installation charge for the Service originally requested.

7. Capacity calculation and policing

- Capacity calculation
  - The Capacity calculation is based on the calculation of the aggregate Capacity usage with a 95th percentile threshold. This method is industry standard and provides the equivalent Capacity required to support the total traffic flow on a single access port.
  - Capacity usage is determined by collecting upstream and downstream Capacity usage samples, for each access points in the network, every 5 minutes throughout the month (a sample is based upon the average usage across the 5-minute segment).
  - After collection of the samples for all access points in the network, upstream samples for each 5 minute interval are added into a single data set that represents the aggregate Capacity. After aggregation the 95th percentile is calculated. The result of the calculation represents the aggregate upstream Capacity usage.
  - After collection of the samples for all access points in the network downstream samples for each 5 minute interval are added into a single data set that represents the aggregate Capacity. After aggregation the 95th percentile is calculated. The result of the calculation represents the aggregate downstream Capacity usage.
  - After calculation of the aggregate upstream Capacity usage and the aggregate downstream Capacity usage the lowest value is discarded, and the highest value is used for billing.
  - Policing of CDR and BDR
  - No policing of the National IP Service is enforced. It is the responsibility of the Service Taker to enforce bandwidth restrictions in its own Network if desired.

- Example of a Capacity calculation:

- In a 30-day billing period, 8,640 samples are collected for the BGP access point and directions (Upstream/downstream, 12 samples/hour * 24 hours/day * 30 days). The samples are aggregated into one dataset and listed from highest to lowest. With the 95th percentile calculation, the highest 5% Capacity usage (or 432 samples representing the top 5% of usage levels are discarded). The highest remaining sample (sample 433 in this example) is used to determine total Capacity usage.
- Charging of National IP CDR and BDR for Global IP Usage
- In order to avoid double charging for Global IP traffic served to locations outside of Nuuk via Service Providers network which may traverse the National IP service twice, traffic between the Global IP Service and the Service Providers Connect IP service in Nuuk is not included in the calculation of National IP. However, if the CDR and BDR calculated is less than the CDR and BDR for the Global IP service, the CDR and BDR values from the Global IP calculation is applied.

8. Priority Share Calculation

The priority share is based on Service Taker's total subscribed Network Priority in the calendar month prior to the first day of network degradation, and Service Taker's actual used capacity in the impacted area in the month prior to network degradation.

In case of Network degradation, the Service Taker will receive a priority share of the National IP capacity available in the impacted area, based on the principles in the formula below.

First a relative ratio is calculated for each OLO:

Ratio = Subscribed **Priority** / Subscribed **CDR** * actual 95th percentile usage **Prev. month**

Where:

- "Subscribed **Priority"** is the total Network Priority subscribed by the Service Taker
- "Subscribed **CDR"** is the total NIP subscribed by the Service Taker
- "actual 95th percentile usage **Prev. month**" is the actual usage in the area that experiences network degradation.

Then the Priority share of capacity is calculated according to the Ratios of all Service Takers:

Priority Share = Available IP Capacity / ∑ all **Ratios *** own **Ratio**

Example:

OLO	CDR	Priority	Prev. Month *1	Ratio	Priority share *2	
OLO1	8.000	1900	1.842	**437**	**281**	Mbit/s
OLO2	200	0	81	**0**	**0**	Mbit/s
OLO3	300	100	70	**23**	**15**	Mbit/s
OLO4	400	800	122	**244**	**157**	Mbit/s
OLO5	500	250	146	**73**	**47**	Mbit/s
Sum				778	**500**	Mbit/s
Available IP Capacity: *1		500	Mbit/s			

Ratio = Subscribed **Priority** / Subscribed **CDR** * actual 95th percentile usage **Prev. month**
Priority share = Available IP Capacity / ∑ all **Ratios** * own **Ratio**

*1 in affected area
*2 Rounded to integers

If Service Taker has given notice of cancellation or downgrading of Network Priority to take effect after the calendar month prior to network degradation, the calculation of network priority will be based on the Service Taker's revised Network Priority subscription. Cancellation and downgrading of Network Priority cannot be revoked by the Service Taker in the notice period to retain the Service Taker's priority share after an occurrence of network degradation.

Service orders for increased network priority will not be applied to the calculation of priority ratios for network degradations which are active at the time of the service order.

9. Technical Description

A technical description of National IP Service is contained in Annex D6 of this Agreement.

10. Charging

The Service Taker will pay TELE-POST all relevant charges as calculated using the charges specified in the Price List Annex, Annex G of this Agreement.

11. Billing

The Billing arrangements for this service are set out in Annex B of this Agreement.