

# Application Note

## SN1400 PSTN and Terminal Gateway for e-phone®

(Supported with SmartWare Release 2.20)

### System Overview

This configuration note describes SmartNode gateways in an e-phone® environment. The SmartNodes can be used as Trunk Gateways to connect to public or private ISDN networks, as Terminal Gateways to integrate ISDN and analogue devices in an e-phone environment and as a combination of both. This configuration note covers all these gateway types and defines SmartNode template configurations, which can be adapted with little effort to the network you want to configure.

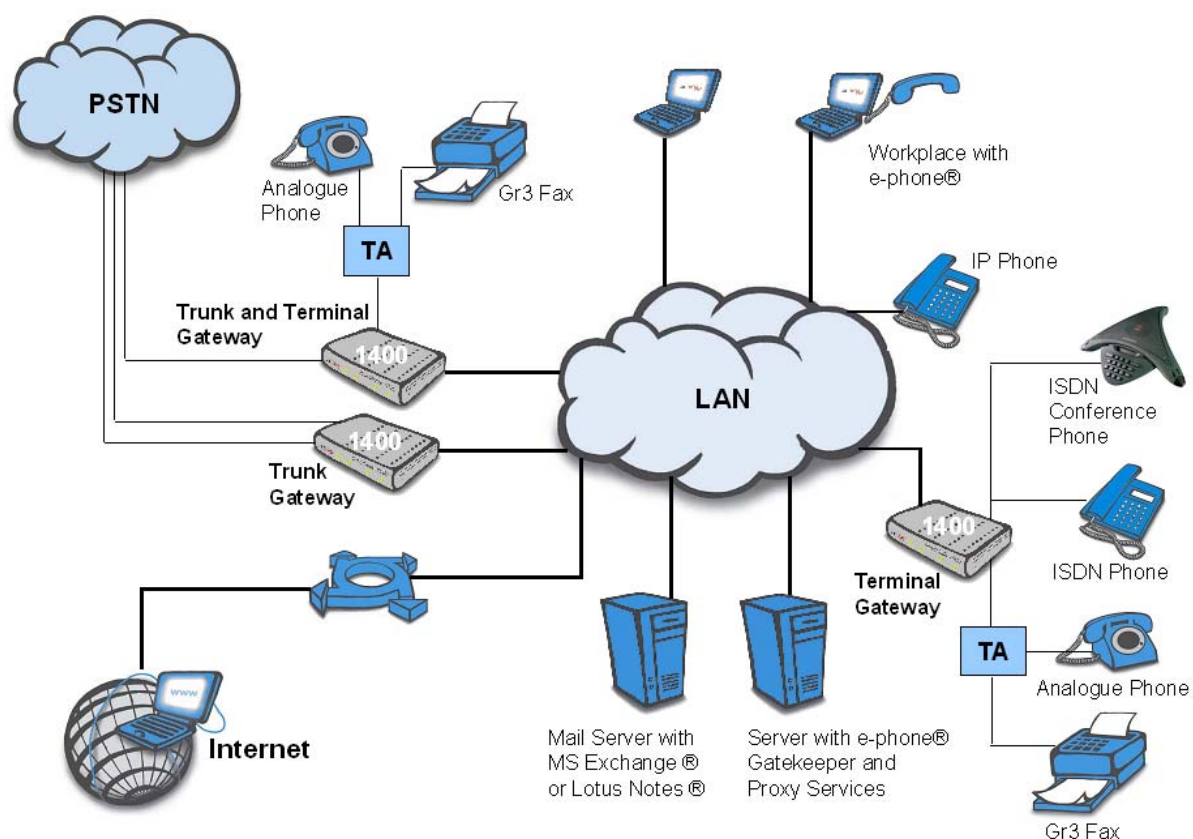


Figure 1: Schematic diagram of the example network

In this example the ISDN network access consists of three S<sub>0</sub>/BRI lines to the PSTN in a point-to-point configuration with direct dialling (DDI). The DDI block consists of three digits (0 .. 999).

Please note: A Terminal Gateway subscriber cannot initiate a call transfer (neither attended nor blind).

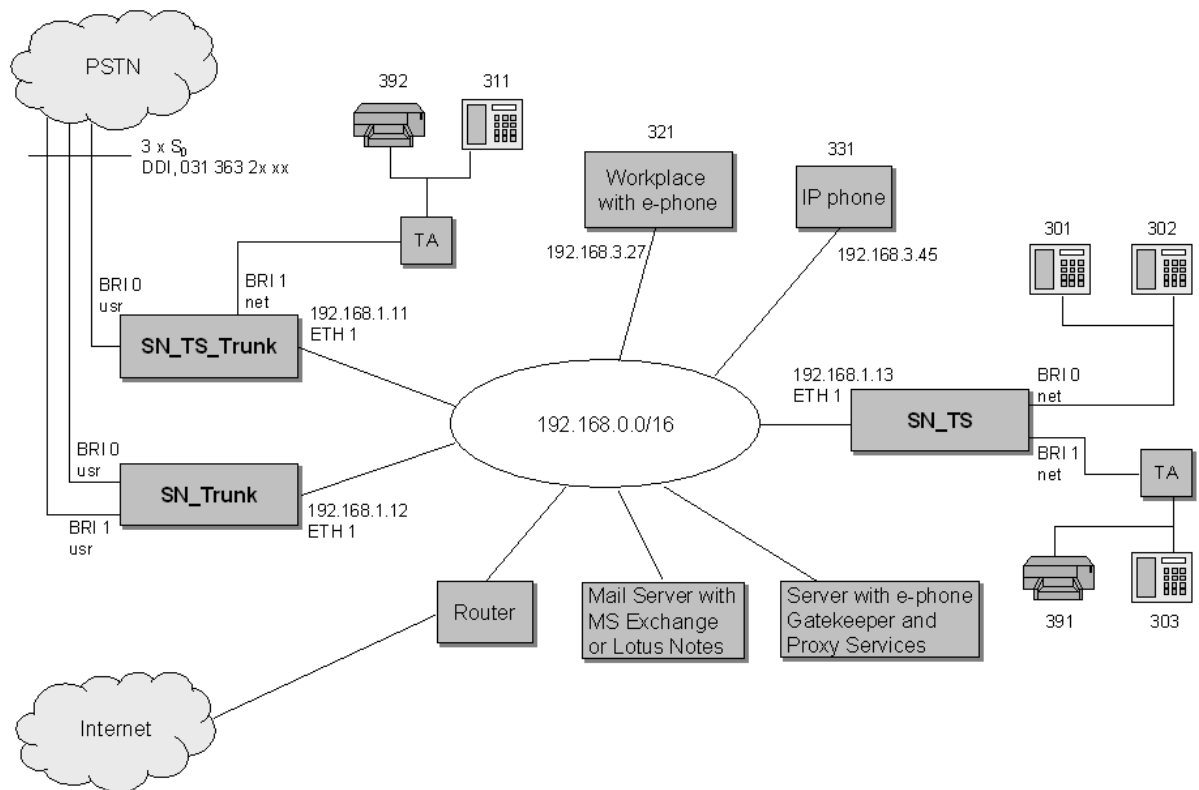
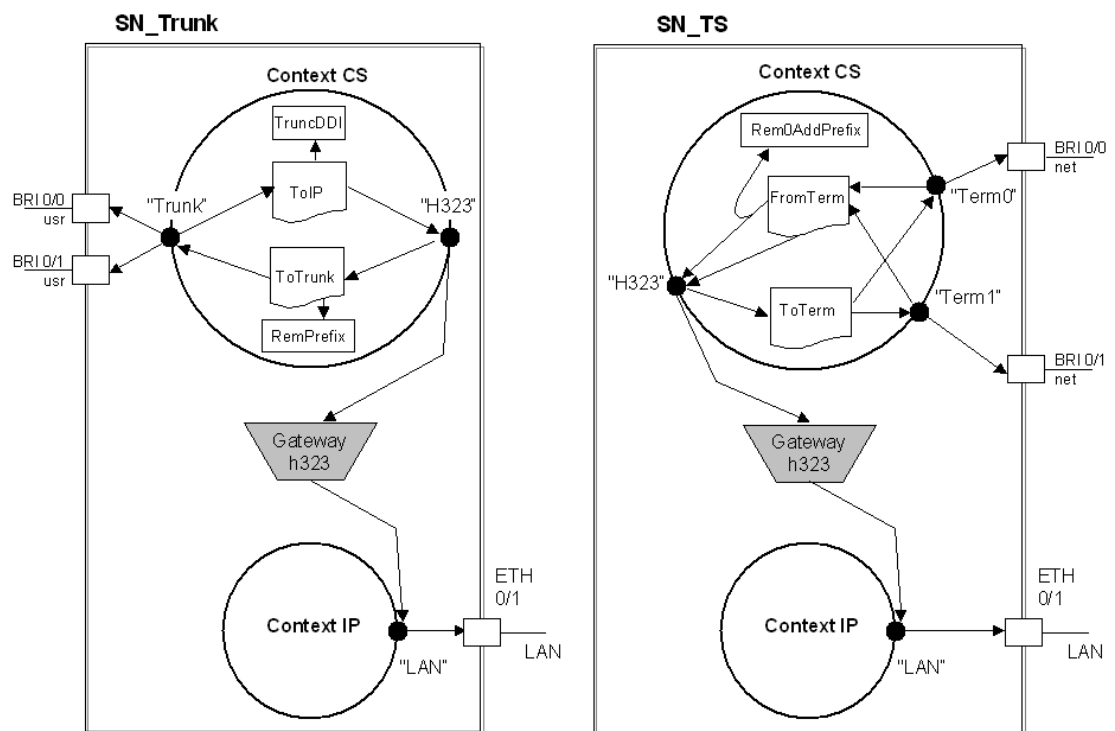


Figure 2: Detailed schematics of the complete network

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## SmartNode Configuration



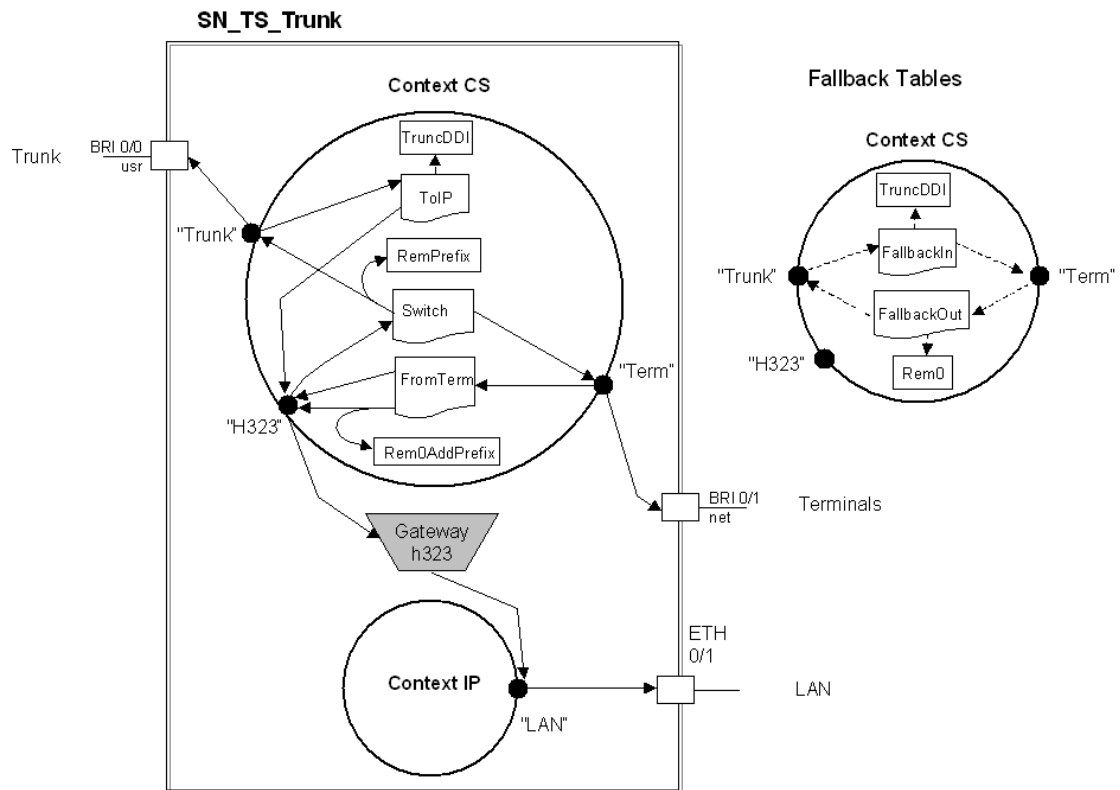


Figure 3: Schematic of SmartNode configurations

## Session Router Configuration

This section describes the Session Router Configuration according to the installation as a:

### Trunk Gateway (SN\_Trunk)

*Calls coming from the trunk:* The called party number must be truncated to the last three digits (internal number length in this example). This is done with the number manipulation function *TruncDDI*.

*Calls destined for the trunk:* For these calls the called party number always starts with the prefix 5\*. This prefix added by the e-phone clients or the SmartNodes working as Terminal Gateways must be removed with the number manipulation function *RemPrefix*.

### Terminal Gateway (SN\_TS)

*Calls coming from the Terminals:* The called party number table *FromTerm* routes internal calls directly to the LAN via the interface H323. If the call is destined for the trunk (external number with an additional leading 0, e.g. 0031 223 45 67) the leading 0 is removed with the number manipulation function *Rem0*, and the prefix 5\* is added with the number manipulation function *AddPrefix* (the e-phone gatekeeper requires this prefix for external calls). Then the call is routed to the LAN via the interface H323.

*Calls destined for the Terminals:* Depending on the called party number the call must be routed either to the BRI port 0 or 1. This decision is taken within the called party number table *ToTerm*.

### Terminal and Trunk Gateway (SN\_TS\_Trunk)

*Calls coming from the trunk:* The called party number must be truncated to the last three digits (internal number length in this example). This is done with the number manipulation function *TruncDDI*.

*Calls coming from the Terminals:* The called party number table *FromTerm* routes internal calls directly to the LAN via the interface H323.

If the call is destined for the trunk (external number with an additional leading 0, e.g. 0031 223 45 67) the leading 0 is removed with the number manipulation function *Rem0*, and the prefix 5\* is added with the number manipulation function *AddPrefix* (the e-phone gatekeeper requires this prefix for external calls). Then the call is routed to the LAN via the interface H323.

*Calls coming from the LAN destined for the Terminals or the Trunk:* The called party number table *Switch* routes the calls with the prefix 5\* to the trunk. This prefix added by the e-phone clients or the SmartNodes working as Terminal Gateways must be removed with the number manipulation function *RemPrefix*.

All others calls are routed to the Terminals. In this case the called party number is not modified.

*Fallback strategies:* By means of the fallback tables *FallbackIn* and *FallbackOut* the terminals are always connected to the PSTN even in a situation where the e-phone system is out of order.

### H.323 Gateway Configuration

The SmartNodes working as Trunk Gateways (SN\_Trunk and SN\_TS\_Trunk) must register at the gatekeeper with 5\* (*alias e164 5\**). The SmartNodes used as Terminal Gateways (SN\_TS and SN\_TS\_Trunk) must register all numbers of the connected terminals at the gatekeeper (*alias e164 <number>*).

The options h245 tunnelling, faststart and h235 security must be disabled within an e-phone environment (*no h245-tunneling, no faststart, no h235security*).

With the command *gatekeeper-discovery auto* the SmartNodes automatically detect the gatekeeper.

### Port Configuration

With smart disconnect enabled, calls are terminated immediately when a disconnect message is received. For a SmartNode in an e-phone environment this feature must be enabled for both call directions (*smart-disconnect from-isdn-calls, smart-disconnect to-isdn-calls*).

### Interface Configuration

The e-phone® gatekeeper does not support overlap dialling. Nevertheless with a SmartNode used as a Terminal Gateway terminals, which do not support bloc sending, can be integrated.

To allow overlap dialling on the connected terminals digit collection is applied to the interface h323 H323 (digit-collection timeout 3) on the SmartNodes used as Terminal Gateways (SN\_TS and SN\_TS\_Trunk).

## 3<sup>rd</sup> Party Equipment

### Terminals

The correct MSN's must be set on each terminal or terminal adapter.

### How To Adapt To Your Network

#### IP Addresses

The IP address and subnet mask can easily be modified within the *context ip router* in the *interface LAN* with the command *ipaddress*.

#### DDI Block Size, Internal Numbering Plan

In this example it is assumed that the DDI block consists of three digits (0 .. 999). If the size of your DDI block is different you must modify the number manipulation function *TruncDDI* of the Trunk Gateways (SN\_Trunk and SN\_TS\_Trunk). E.g. 2-digit DDI block 0 .. 99: *number-manipulation TruncDDI cdpn truncate 2*.

To adapt to your internal numbering plan you must modify the *alias e164* commands within the *gateway h323* of the Terminal Gateways (SN\_TS and SN\_TS\_Trunk) and the entries of the called party number table *ToTerm* of the Terminal Gateway SN\_TS.

#### Adding Additional Terminals

Additional terminals can be added to a SmartNode used as a Terminal Gateway (SN\_TS and SN\_TS\_Trunk). The SmartNode must register the numbers of the new terminal at the gatekeeper. This is done within the *gateway h323* with the command *alias e164 <number>*. Furthermore an entry in the called party number table *ToTerm* of SN\_TS is needed. E.g. a terminal with the number 304 is connected to BRI 1 of SN\_TS. New entry: *called-party ToTerm 304 dest-interface Term1*.

### Additional Features

#### Integrated Data Router

The SmartNode comes with a full-fledged data router with real-time capabilities including sophisticated QoS features. Therefore the functionality of the additional external router (shown in figure 1 and figure 2) could be taken over by one of the SmartNodes. Please refer to the Software Configuration Guide or a Configuration Note, which covers this topic (e.g. S-Bus Extension).

### Complete Configurations

(As of SmartWare releases 2.02)

Available as .cfg files

#### SN\_Trunk

```
#-----#
# Project:   Configuration Note e-phone Gateway
# Element:   SN_Trunk (Trunk Gateway), SN1400
# Author:    KK
# Date:      12.09.2002
#-----#

cli version 2.00
snmp community public ro
system hostname SN_Trunk

system
    synchronize-to-isdn-time

context ip router

interface LAN
    ipaddress 192.168.1.12 255.255.0.0
    mtu 1500

context ip router
    multicast-send default-interface LAN

context cs switch
    no number-prefix national
    no number-prefix international
    use tone-set-profile default

    called-party ToIP default dest-interface H323 TruncDDI
    number-manipulation TruncDDI cdpn truncate 3

    called-party ToTrunk 5* dest-interface Trunk RemPrefix
    number-manipulation RemPrefix cdpn remove 2

interface pstn Trunk
    routing dest-table ToIP
    bind port 0 0
    bind port 0 1

interface h323 H323
    routing dest-table ToTrunk
    bind gateway h323
```



```
context cs switch
  no shutdown

gateway isoip
  shutdown
  use voip-profile default

gateway h323
  alias e164 5*
  codec g711ulaw64k 20 20
  no faststart
  no h245-tunneling
  terminal-type gateway
  ras
  gatekeeper-discovery auto
  no h235security
  bind interface LAN router
  no shutdown
  use voip-profile default

port ethernet 0 0
  medium 10 half
  shutdown

port ethernet 0 1
  medium 10 half
  encapsulation ip
  bind interface LAN router
  no shutdown

port isdn 0 0
  down
  channel-range 0 1
  l2proto pp
  l3proto dss1
  max-channels 2
  smart-disconnect from-isdn-calls
  smart-disconnect to-isdn-calls
  uni-side usr
  up

port isdn 0 1
  down
  channel-range 0 1
  l2proto pp
  l3proto dss1
  max-channels 2
  smart-disconnect from-isdn-calls
```





```
smart-disconnect to-isdn-calls
uni-side usr
up
```

### SN\_TS

```
#-----#
# Project:   Configuration Note e-phone Gateway
# Element:   SN_TS (Terminal Gateway), SN1400
# Author:    KK
# Date:      12.09.2002
#-----#
```

```
cli version 2.00
snmp community public ro
system hostname SN_TS
```

```
system
    local-inband-tones
```

```
context ip router
```

```
interface LAN
    ipaddress 192.168.1.13 255.255.0.0
    mtu 1500
```

```
context ip router
    multicast-send default-interface LAN
```

```
context cs switch
    no number-prefix national
    no number-prefix international
    use tone-set-profile default
```

```
called-party ToTerm 301 dest-interface Term0
called-party ToTerm 302 dest-interface Term0
called-party ToTerm 303 dest-interface Term1
called-party ToTerm 391 dest-interface Term1
```

```
called-party FromTerm 00 dest-interface H323 Rem0AddPrefix
called-party FromTerm default dest-interface H323
```

```
complex-function Rem0AddPrefix Rem0
complex-function Rem0AddPrefix AddPrefix
```

```
number-manipulation Rem0 cdpn remove 1
number-manipulation AddPrefix cdpn add 5*
```

```
interface pstn Term0
    routing dest-table FromTerm
```



```
bind port 0 0

interface pstn Term1
  routing dest-table FromTerm
  bind port 0 1

interface h323 H323
  routing dest-table ToTerm
  digit-collection timeout 3
  bind gateway h323

context cs switch
  no shutdown

gateway isoip
  shutdown
  use voip-profile default

gateway h323
  alias e164 301
  alias e164 302
  alias e164 303
  alias e164 391
  codec g711ulaw64k 20 20
  no faststart
  no h245-tunneling
  terminal-type gateway
  ras
  gatekeeper-discovery auto
  no h235security
  bind interface LAN router
  no shutdown
  use voip-profile default

port ethernet 0 0
  medium 10 half
  shutdown

port ethernet 0 1
  medium 10 half
  encapsulation ip
  bind interface LAN router
  no shutdown

port isdn 0 0
  down
  channel-range 0 1
  l2proto pmp
  l3proto dss1
```



```
max-channels 2
smart-disconnect from-isdn-calls
smart-disconnect to-isdn-calls
uni-side net
up

port isdn 0 1
down
channel-range 0 1
l2proto pmp
l3proto dss1
max-channels 2
smart-disconnect from-isdn-calls
smart-disconnect to-isdn-calls
uni-side net
up
```

### SN\_TS\_Trunk

```
#-----#
# Project: Configuration Note e-phone Gateway
# Element: SN_TS_Trunk (Terminal and Trunk Gateway), SN1400
# Author: KK
# Date: 12.09.2002
#-----#

cli version 2.00
snmp community public ro
system hostname SN_TS_Trunk

system
synchronize-to-isdn-time

context ip router

interface LAN
ipaddress 192.168.1.11 255.255.0.0
mtu 1500

context ip router
multicast-send default-interface LAN

context cs switch
no number-prefix national
no number-prefix international
use tone-set-profile default

called-party FallbackIn default dest-interface Term TruncDDI
called-party FallbackOut default dest-interface Trunk Rem0
```

```
called-party Switch 5* dest-interface Trunk RemPrefix
called-party Switch default dest-interface Term

called-party FromTerm 00 dest-interface H323 Rem0AddPrefix
called-party FromTerm default dest-interface H323

called-party ToIP default dest-interface H323 TruncDDI

complex-function Rem0AddPrefix Rem0
complex-function Rem0AddPrefix AddPrefix

number-manipulation Rem0 cdpn remove 1
number-manipulation AddPrefix cdpn add 5*
number-manipulation TruncDDI cdpn truncate 3
number-manipulation RemPrefix cdpn remove 2

interface pstn Term
  routing dest-table FromTerm
  fallback dest-table FallbackOut
  bind port 0 1

interface pstn Trunk
  routing dest-table ToIP
  fallback dest-table FallbackIn
  bind port 0 0

interface h323 H323
  routing dest-table Switch
  digit-collection timeout 3
  bind gateway h323

context cs switch
  no shutdown

gateway isoip
  shutdown
  use voip-profile default

gateway h323
  alias e164 5*
  alias e164 311
  alias e164 392
  codec g711ulaw64k 20 20
  no faststart
  no h245-tunneling
  terminal-type gateway
  ras
  gatekeeper-discovery auto
```



```
no h235security
bind interface LAN router
no shutdown
use voip-profile default

port ethernet 0 0
  medium 10 half
  shutdown

port ethernet 0 1
  medium 10 half
  encapsulation ip
  bind interface LAN router
  no shutdown

port isdn 0 0
  down
  channel-range 0 1
  l2proto pp
  l3proto dss1
  max-channels 2
  smart-disconnect from-isdn-calls
  smart-disconnect to-isdn-calls
  uni-side usr
  up

port isdn 0 1
  down
  channel-range 0 1
  l2proto pmp
  l3proto dss1
  max-channels 2
  smart-disconnect from-isdn-calls
  smart-disconnect to-isdn-calls
  uni-side net
  up
```