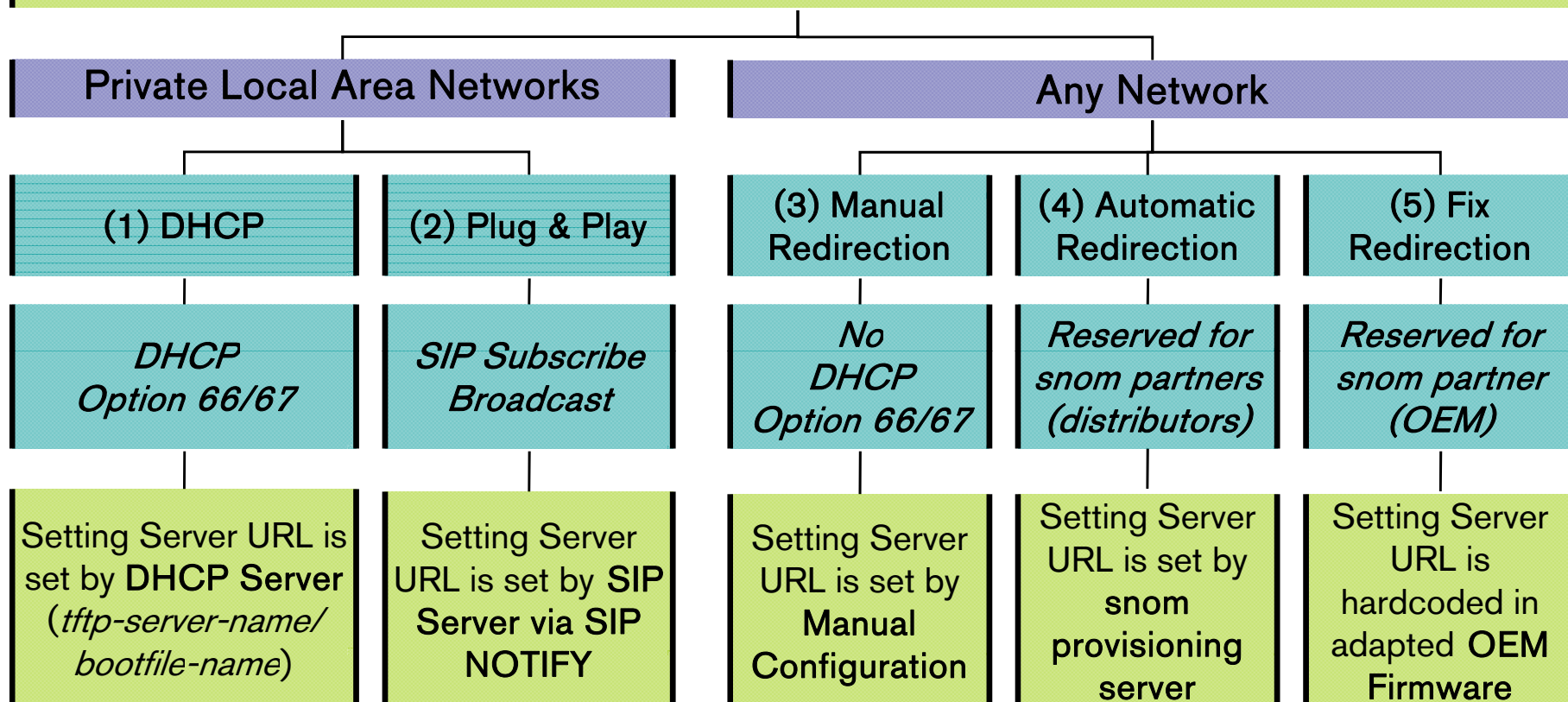


- ① Mass deployment (aka „Auto Provisioning“) is a function which is implemented proprietarily in the default firmware of all snom 3xx VoIP phones.
- ① Mass deployment allows remote *configuration* and *maintenance* of an unlimited number of distinct snom phone types.
- ① Mass Deployment is particularly useful for out-of-the-box scenarios in larger phone installations.
- ① Mass Deployment can be used to provide general and specific configuration parameters to the phones (aka „Settings“, e.g. language, timezone, tone scheme, SIP identity) and initiates firmware updates/ downgrades.

Implementation depends on the phone installation environment



① Setting Server provide configuration parameters and firmware updates to snom phones.

- TFTP Server, e.g. tftp://mytftpserver
- HTTP (S) Server, e.g. http://provisioning.mycompany.com, https://10.0.0.2

	Provisioning of configuration parameter	Provisioning of firmware images
TFTP	Yes	From V7.2: Yes
HTTP	Yes	Yes
HTTPS	Yes	No

- Setting Server can be hosted on private or public servers depending on the mass deployment method

	DHCP	Plug & Play	Manual Redirection	Automatic Redirection	Fix Redirection
Private	Yes	Yes	Yes	No	No
Public	No	No	Yes	Yes	Yes

- ① **(1) Write- protected system parameters**
 - are used internally and cannot be changed
 - factory value is marked by „&“ symbol
 - For example: mac&: 0004132YXXXX

- ① **(2) Unprotected system parameters**
 - are used internally and can only be changed via mass deployment
 - For example: dst!: 3600 03.05.07 02:00:00 10.05.07 03:00:00

- ① **(3) Free configurable parameters**
 - are those settings which can be changed via the web user interface
 - For example: dhcp!: on

- All available configuration parameter types are listed on the web user interface page „Settings“:

Settings		VERSION 7
Operation		
Home		Click here to save the settings.
Directory		Click here to save the settings in XML format.
Setup		
Preferences		language!: English
Speed Dial		redirect_number!: 123
Function Keys		redirect_busy_number!:
Identity 1		redirect_time_number!: 123
Identity 2		redirect_event!: none
Identity 3		redirect_time!: 2
Identity 4		redirect_time_on_code!:
		redirect_time_off_code!:
		redirect_always_on_code!:

○ A description of each configuration parameter and its relationship to the web user interface configuration can be found on the WIKI:

- http://wiki.snom.com/Snom3x0/Web_Interface/V6/Settings
- http://wiki.snom.com/Snom3x0/Web_Interface/V7/Settings

phone select menu

- snom370
- snom360
- snom320
- snom300
- snom2xx
- snom1xx

navigation links

- Main Page
- Firmware
- Web Interface
- Phone Interface
- Documentation
- Mass Deployment
- FAQ
- Hardware
- Accessories
- Functions
- Networking
- Interoperability

snom 3xx series Web User Interface			
			
snom 300 Web User Interface	snom 320 Web User Interface	snom 360 Web User Interface	snom 370 Web User Interface
Shortcuts to Common Web User Interface Menus			
<ul style="list-style-type: none">▪ Preferences (V7 V6)▪ Identities (V7 V6)▪ Function Keys (V7 V6)▪ Advanced (V7 V6)▪ Settings (V7 V6)	<ul style="list-style-type: none">▪ Preferences (V7 V6)▪ Identities (V7 V6)▪ Function Keys (V7 V6)▪ Advanced (V7 V6)▪ Settings (V7 V6)	<ul style="list-style-type: none">▪ Preferences (V7 V6)▪ Identities (V7 V6)▪ Function Keys (V7 V6)▪ Advanced (V7 V6)▪ Settings (V7 V6)	<ul style="list-style-type: none">▪ Preferences (V7)▪ Identities (V7)▪ Function Keys (V7)▪ Advanced (V7)▪ Settings (V7)

- In Version 7 each web user interface configuration menu provides direct access to the description page of the related parameter

- http://wiki.snom.com/Settings/parameter_name

General Information:

Webinterface Language:

Language:

Number Display Style:

Tone Scheme:

MWI Notification:

MWI Dial Tone:

Use Headset Device:

Use Backlight:

U.S. date format (mm/dd):

24 Hour clock:

Use Flash Plugin:

Message LED for Dialog State/Missed Calls:

Active Identity Scrolling:

Show identity index:

Show call status info:

The screenshot shows a configuration menu with various settings. A red rectangular box highlights a vertical column of settings, including dropdown menus for 'English', 'English', 'Name', 'Germany', 'Silent', 'Stutter', and 'None', and radio button options for 'on' and 'off'. Each setting has a small question mark icon to its right, indicating a help or description link.

- ① **Setting files are container for configuration parameters.**
- ① **Use as little parameters as necessary:**
 - General settings e.g. language\$, timezone\$, etc.
 - Account specific settings, e.g. user_pname1\$, user_name1\$, user_realname1\$, user_host1, user_srtp1\$ etc.
 - Firmware Update related settings, e.g. firmware_status, update_policy, firmware_interval
- ① **Use „\$“ flags at the beginning**
 - \$ → The parameter is changeable, but will be overwritten on each reboot. In the web user interface “Settings” page it will appear as “!”.
 - ! → Parameter will not be overwritten when it was changed manually by the user.
 - & or no flag → will definitely overwrite existing setting and mark it „read-only“ → write protection can only be removed by „Factory Reset“ or mass deployment.
- ① **Do NOT use**
 - Network parameters (if DHCP is used), e.g. dhcp, gateway, dns_server1 etc.
 - Setting server URL unless you want to redirect the phone to a different setting server
 - Firmware parameters, i.e. firmware/ bootloader → use ONLY "firmware_status" instead
 - Internal parameters, e.g. update_server, update_filename, update_host_b, update_host_f, sip_port, reset_settings, reboot_after_nr, watch_arp_cache etc.

o Setting files are XML tagged ASCII- based files

- XML header is required
 - `<?xml version="1.0" encoding="utf-8"?>`
- The following XML tags are supported
 - `<phone-settings>`, `<function-keys>`, `<phone-book>`, `<dialplan>`, `<firmware-settings>`, `<setting-files>`, `<settings>`, `<gui-languages>`, `<phrases>`, `<web-languages>`, `<w_phrases>`

```
<?xml version="1.0" encoding="utf-8"?>
<phone-settings>
  <language perm="">English</language>
  <redirect_number perm="$">253</redirect_number>
  <setting_server perm="">http://.../snom.php?mac={mac}</setting_server>
  ...
  <user_realname idx="1" perm=""> </user_realname>
  <user_realname idx="12" perm=""> </user_realname>
  ...
</phone-settings>
```

Configuration parameter

Identity
Index

Flag

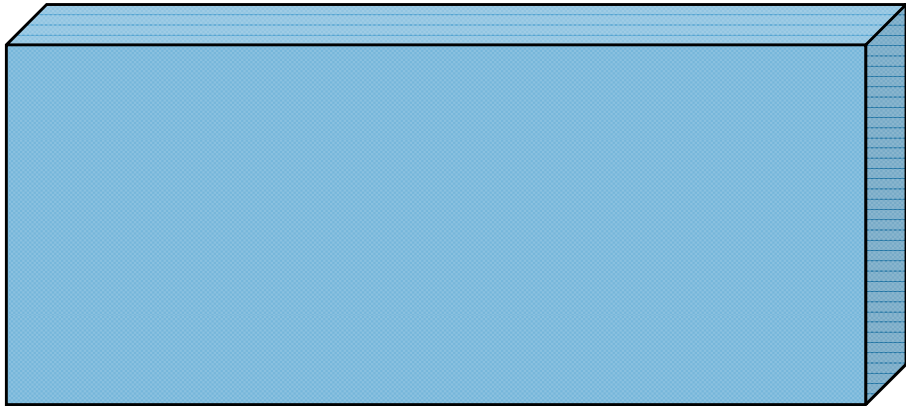
Value

- XML container is a file construct which allows to load ~~more than one file type in one go~~ onto the phone
- <setting-files> tag
 - **Should be the first XML file provided to the phone**
 - Contains **URL's to all setting** files to be provisioned
 - The files are requested **in the given order**
 - **Backwards compatible**: Setting files encoded in the older plain settings format used before firmware release 7 can be included, however the new dial plan format cannot be used in this case.

- (1) XML Container file for general configuration files and language files
 - *<http://ss/snom3x0.htm> (due to backwards compatibility reasons in mixed phone type environments use „htm“ extension instead of „xml“ for automatical phone recognition)*

- (2) XML Container file for specific configuration and language files
 - *<http://ss/snom3x0-MAC.htm> (the „-MAC“ string is automatically appended by the phone)*

(1) <http://ss/snom3x0.htm>



(2) <http://ss/snom3x0-MAC.htm>



- ④ (3) XML Settings file for general configuration parameters
 - *<http://ss/snom3x0/general.xml>*
- ④ (4) XML Container file for general phone user interface languages
 - *<http://ss/gui-lang.xml>*
- ④ (5) XML Container file for general web user interface languages
 - *<http://ss/web-lang.xml>*
- ④ (6) XML Settings file for specific configuration parameters
 - *<http://ss/snom3x0/MAC.xml>*

(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml" />
  <file url="http://ss/gui-lang.xml" />
  <file url="http://ss/web-lang.xml" />
</setting-files>
```

(3) <http://ss/3x0/general.xml>



(2) <http://ss/snom3x0-MAC.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/MAC.xml" />
  ...
</setting-files>
```

(6) <http://ss/3x0/MAC.xml>



(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml" />
  <file url="http://ss/gui-lang.xml" />
  <file url="http://ss/web-lang.xml" />
</setting-files>
```

(3) <http://ss/3x0/general.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>...</phone-settings>
  <function-keys>...</function-keys>
  <phone-book>...</phone-book>
  <dial-plan>...</dial-plan>
</settings>
```

(2) <http://ss/snom3x0-MAC.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/MAC.xml" />
  ...
</setting-files>
```

(6) <http://ss/3x0/MAC.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>...</phone-settings>
  ...
</settings>
```

🔗 <phone-settings>

- Contains the main part of available **configuration parameters** and the **URL of the firmware configuration file**

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<phone-settings>
```

```
<language perm="!">English</language>
```

```
<redirect_number perm="$">253</redirect_number>
```

```
...
```

```
<user_realname idx="1" perm="&"></user_realname>
```

```
<firmware perm="">http://ts/3x0/firmware.xml</firmware>
```

```
...
```

```
</phone-settings>
```

Value

Configuration parameter

Identity
Index

Flag

- Firmware updates / downgrades are defined in the firmware configuration file whose URL must only be specified in the `<phone-settings>` tag
- (7) XML firmware configuration file
 - *<http://ss/3x0/firmware.xml> (contains the URL of the firmware image; do not use any flags)*
- (8) Firmware image file for firmware update
 - *<http://ss/3x0/snom3x0-7.X-SIP-f.bin> (firmware image file)*

(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml" />
  <file url="http://ss/gui-lang.xml"/>
  <file url="http://ss/web-lang.xml"/>
  ...
</setting-files>
```

(3) <http://ss/3x0/general.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>...</phone-settings>
  <function-keys>...</function-keys>
  <phone-book>...</phone-book>
  <dialplan>...</dialplan>
</settings>
```

```
<?xml version="1.0" encoding="utf-8"?>
<phone-settings>
  ...
  <firmware_status perm="">
    http://ss/3x0/firmware.xml
  </firmware_status>
  ...
</phone-settings>
```

(7) <http://ss/3x0/firmware.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<firmware-settings>
  <firmware perm="">
    http://ss/3x0/snom3x0-7.X-SIP-f.bin
  </firmware>
</firmware-settings>
```

❶ <firmware-settings>

- This XML file type must not be included in container setting files
- The phone will download the firmware XML file specified in the URL configured under *firmware_status*
- The setting *firmware_status* can **ONLY** be defined in the settings file of type <phone-settings>

```
<?xml version="1.0" encoding="utf-8" ?>
```

Value = Firmware Image

```
<firmware-settings>
```

```
<firmware perm="">http://.../snom-7.1.9-SIP-f.bin</firmware>
```

```
</firmware-settings>
```

Do not use any flag

Configuration parameter = firmware

(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml" />
  <file url="http://ss/gui-lang.xml" />
  <file url="http://ss/web-lang.xml" />
</setting-files>
```

(3) <http://ss/3x0/general.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>...</phone-settings>
  <function-keys>...</function-keys>
  <phone-book>...</phone-book>
  <dial-plan>...</dial-plan>
</settings>
```

(2) <http://ss/snom3x0-MAC.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/MAC.xml" />
  ...
</setting-files>
```

(6) <http://ss/3x0/MAC.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <function-keys>...</function-keys>
  ...
</settings>
```

o <function-keys>

- Defines the free function keys

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<function-keys>
```

```
<fkey idx="0" context="active" perm="$">line</fkey>
```

```
<fkey idx="1" context="1" perm="&">dest  
&lt; sip:423@tst.org;user=phone&gt;</fkey>
```

```
...
```

```
<fkey idx="53" context="12" perm="">line</fkey>
```

```
</function-keys>
```

Index

Value

Context

Flag

(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml" />
  <file url="http://ss/gui-lang.xml" />
  <file url="http://ss/web-lang.xml" />
</setting-files>
```

(3) <http://ss/3x0/general.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>...</phone-settings>
  <function-keys>...</function-keys>
  <phone-book>...</phone-book>
  <dial-plan>...</dial-plan>
</settings>
```

(2) <http://ss/snom3x0-MAC.htm>

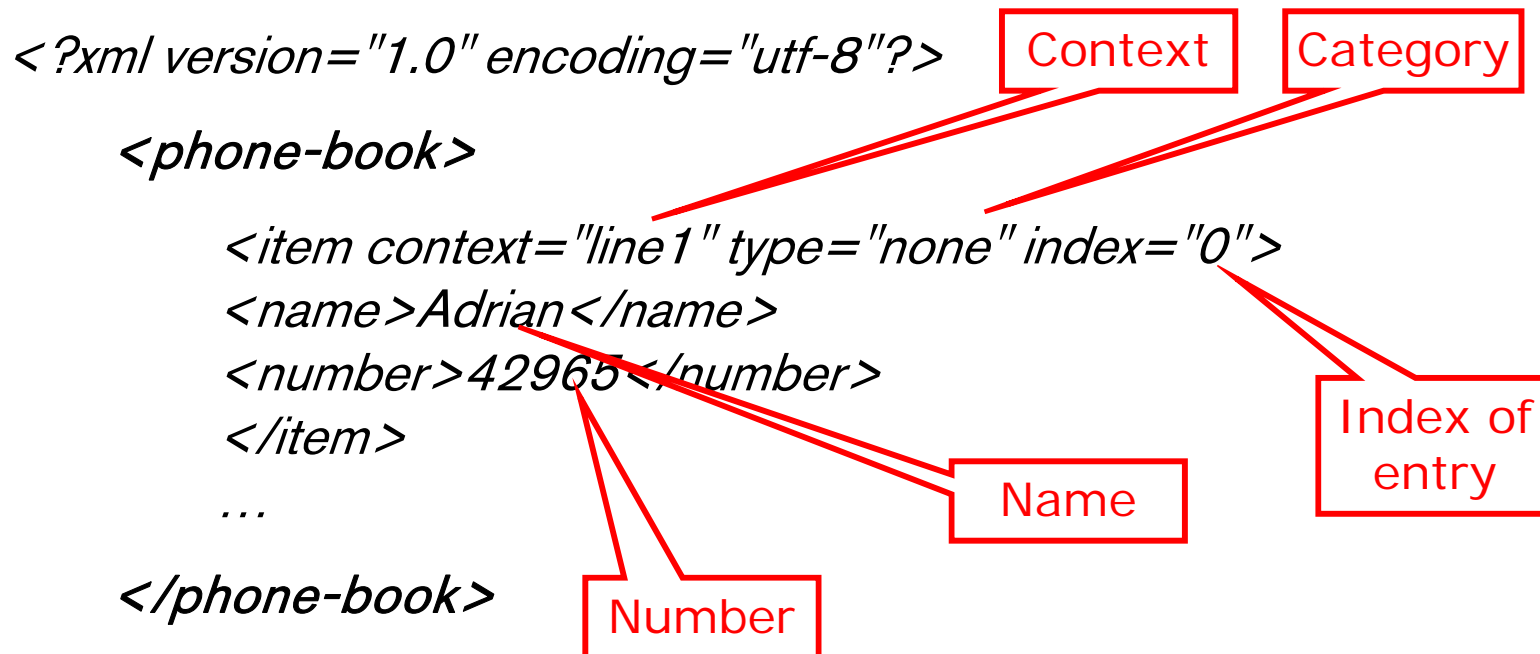
```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/MAC.xml" />
  ...
</setting-files>
```

(6) <http://ss/3x0/MAC.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-book>...</phone-book>
  ...
</settings>
```

◉ <phone-book>

- Defines the entries of the locally stored phone directory



(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml" />
  <file url="http://ss/gui-lang.xml" />
  <file url="http://ss/web-lang.xml" />
</setting-files>
```

(3) <http://ss/3x0/general.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <phone-settings>...</phone-settings>
  <function-keys>...</function-keys>
  <phone-book>...</phone-book>
  <dial-plan>...</dial-plan>
</settings>
```

(2) <http://ss/snom3x0-MAC.htm>

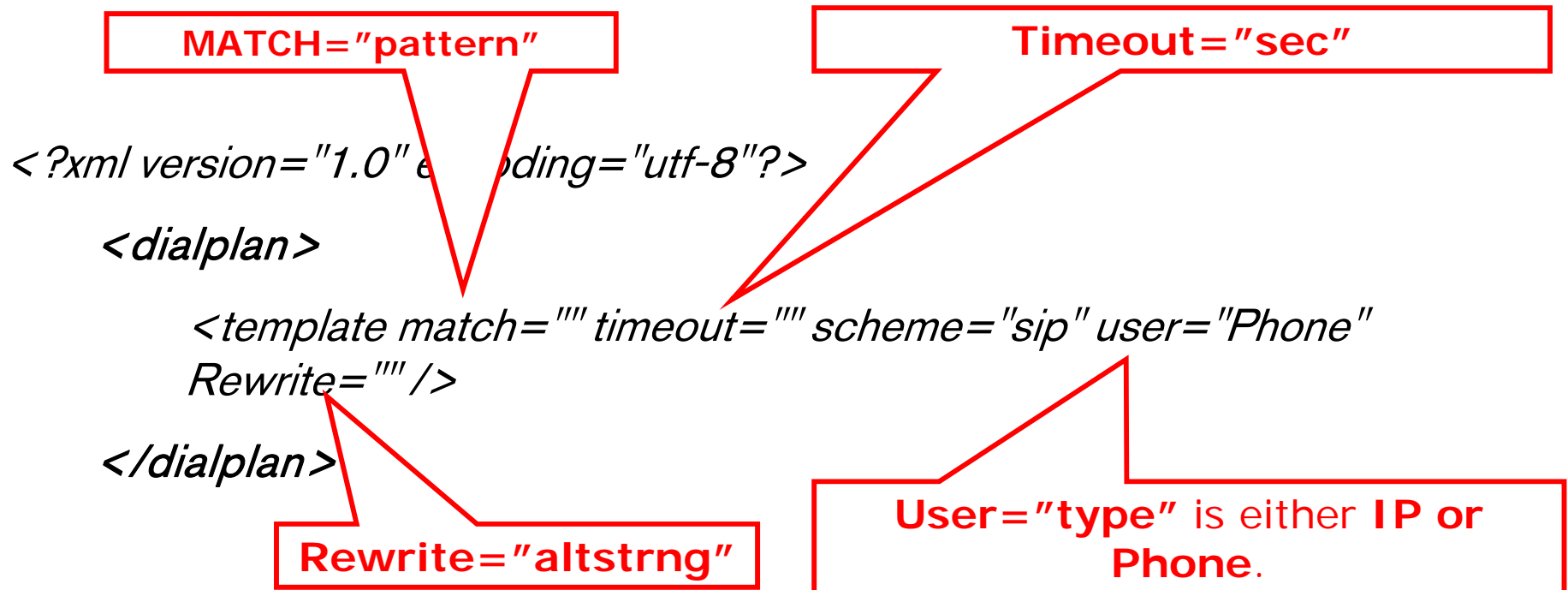
```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/MAC.xml" />
  ...
</setting-files>
```

(6) <http://ss/3x0/MAC.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<settings>
  <dial-plan>...</dial-plan>
  ...
</settings>
```

o <dialplan>

- Dial plans enable the phone to support automatic dialing and automatic generation of a secondary dial tone



o MATCH="pattern"

- is the **dial pattern** to match. While entering the pattern: use a period (.) to match any character or use an asterisk (*) to match one or more characters. To have the phone generate a secondary dial tone when the part of the template matches, use a comma (,).

o Timeout="sec"

- is the **number of seconds** before a timeout will occur and the number will be dialed as entered by the user. To have the number dial immediately, specify 0.

o Rewrite="altstrng"

- is the **alternate string** to be dialed instead of what the user enters. This field can be left empty.

o User="type"

- is either IP or Phone. Enter User=phone or User=IP to have the tag automatically added to the dialed number. Currently User=phone is supported.

- ❶ snom370: *several* languages (default “English”) come pre-installed with the firmware
- ❷ snom300, 320, 360: *one* language (default “English”) is pre-installed with the firmware → additional languages can ONLY be provided via XML provisioning → the selected language will be loaded on request into the phone’s RAM
- ❸ XML language files must match the phone’s application firmware
 - Download always the **newest language files** from: <http://fox.snom.com/config>, e.g. <http://fox.snom.com/config/snomlang-7.1.28.tgz>
 - Automatic language provisioning using <http://fox.snom.com/config/settings.xml> as Setting Server URL
- ❹ Supported XML file tags:
 - <gui-languages>: Defines the language used on the *phone user interface*
 - <web-languages>: Defines the language used on the *web user interface*

(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml"/>
  <file url="http://ss/gui-lang.xml"/>
  <file url="http://ss/web-lang.xml"/>
  ...
</setting-files>
```

(4) <http://ss/gui-lang.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<gui-languages>
  <language url=http://ss/gui_de.xml
    name="Deutsch" />
  ...
</gui-languages>
```

(5) <http://ss/web-lang.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<web-languages>
  <language url=http://ss/web_de.xml
    name="Deutsch" />
  ...
</web-languages>
```

o <gui-languages> / <web-languages>

- may contain several XML language file URLs each for a different language
- Each language file is **unique** for each firmware version and the name string determines how the language will appear in the phone's interface language list.

```
<?xml version="1.0" encoding="utf-8" ?>
```

```
<gui-languages>
```

```
<language url="http://ss/gui_de.xml" name="Deutsch" />
```

```
...
```

```
</gui-languages>
```

The **URL** specified either links to the **official snom** or to **your own translated XML** language file.

The **name** specified will appear in the list of available languages

(1) <http://ss/snom3x0.htm>

```
<?xml version="1.0" encoding="utf-8" ?>
<setting-files>
  <file url="http://ss/3x0/general.xml"/>
  <file url="http://ss/gui-lang.xml"/>
  <file url="http://ss/web-lang.xml"/>
  ...
</setting-files>
```

(4) <http://ss/gui-lang.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<gui-languages>
  <language url=http://ss/gui_de.xml
    name="Deutsch" />
  ...
</gui-languages>
```

(5) <http://ss/web-lang.xml>

```
<?xml version="1.0" encoding="utf-8" ?>
<web-languages>
  <language url=http://ss/web_de.xml
    name="Deutsch" />
  ...
</web-languages>
```

(on request) http://ss/web_de.xml

```
<?xml version="1.0" encoding="utf-8" ?>
<w_phrases>
  <phrase i="0" n="lang_none" t="" />
  ...
</w_phrases>
```

❶ <phrases> / <w_phrases>

- The XML language file contains the phone / web user interfaces text phrases in different languages, e.g. "gui_lang_EN.xml",

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<phrases>
```

```
  <phrase i="0" n="lang_none" t="" />
```

```
  <phrase i="1" n="lang_language_name" t="English" />
```

```
  ...
```

```
  <phrase i="2" n="lang_tbook" t="Book" />
```

```
  ...
```

```
  <language n="lang_language_name" t="English" />
```

```
</phrases>
```

The **translation** of the phrase.

The internal **name** of the phrase.

The **index** of the phrases.

Usage

- This is particularly useful for out of the box setup of devices without using DHCP option 66/ 67

Configuration

- PnP is enabled by default

Update:

Update Policy:

Never update, load settings only

Setting URL:

http://provisioning.snom.com/s

Subscribe Config:

on off

PnP Config:

on off

```
phone_type!: snom300-SIP
codec_tos!: 160
mac&: 000413250518
setting_server!: http://provisioning.snom.com/snom300/
subscribe_config!: 011
pnp_config!: on
ip_addr!: 10.0.0.37
netmask!: 255.255.255.0
update_server!: http://10.0.0.3
dns_domain!: snomtraining
```

- Phone sends a SIP *SUBSCRIBE* message to a multicast address (224.0.1.75)

SIP Trace

Home Clear Reload

Address Book

Setup

- Preferences
- Speed Dial
- Function Keys
- Identity 1
- Identity 2
- Identity 3
- Identity 4
- Identity 5

```
Sent to udp:224.0.1.75:5060 at 24/12/2001 01:00:11:800 (396 bytes):
SUBSCRIBE sip:MAC%3a0004132314A4@VON SIP/2.0
Via: SIP/2.0/UDP 10.0.0.10:2051;rport
From: <sip:MAC%3a0004132314A4@VON>;tag=1542850995
To: <sip:MAC%3a0004132314A4@VON>
Call-ID: 1333736042@10.0.0.10
CSeq: 1 SUBSCRIBE
Event: ua-profile;profile-type="device";vendor="snom";model="snom360";version="6.5.1"
Expires: 0
Accept: application/url
Contact: <sip:10.0.0.10:2051>
Content-Length: 0
```

Plug & Play | SIP SUBSCRIBE (pcap)

Mass Deployment V7

massdeployment - Ethereal

File Edit View Go Capture Analyze Statistics Help

No. -	Time	Source	Destination	Protocol	Info
5	11.083248	snomTech_23:14:a4	Broadcast	ARP	who has 10.0.0.1? Tell 10.0.0.10
6	11.188257	10.0.0.10	224.0.1.75	SIP	Request: SUBSCRIBE sip:MAC%3a0004132314A4@VON SIP/2.0
7	14.084998	snomTech_23:14:a4	Broadcast	ARP	who has 10.0.0.1? Tell 10.0.0.10

Frame 6 (437 bytes on wire, 437 bytes captured)

- Ethernet II, Src: snomTech_23:14:a4 (00:04:13:23:14:a4), Dst: 01:00:5e:00:01:4b (01:00:5e:00:01:4b)
- Internet Protocol, Src: 10.0.0.10 (10.0.0.10), Dst: 224.0.1.75 (224.0.1.75)
- User Datagram Protocol, Src Port: 2058 (2058), Dst Port: 5060 (5060)
- Session Initiation Protocol
 - Request-Line: SUBSCRIBE sip:MAC%3a0004132314A4@VON SIP/2.0
 - Message Header
 - Via: SIP/2.0/UDP 10.0.0.10:2058;rport
 - From: <sip:MAC%3a0004132314A4@VON>;tag=1578833677
 - To: <sip:MAC%3a0004132314A4@VON>
 - Call-ID: 891599124@10.0.0.10
 - CSeq: 1 SUBSCRIBE
 - Event: ua-profile;profile-type="device";vendor="snom";model="snom360";version="6.5.1"
 - Expires: 0
 - Accept: application/url
 - Contact: <sip:10.0.0.10:2058>
 - Content-Length: 0

- ❶ SIP servers which have membership to the group can respond to the SUBSCRIBE and send NOTIFY messages with the setting server HTTP URL in the body
- ❷ The phone retrieves its settings from the URL specified.

```
Received from udp:192.168.100.10:5060 at 24/12/2001 00:00:19:293 (868 bytes):
```

```
NOTIFY sip:192.168.10.67:5060 SIP/2.0
```

```
...
```

```
To: <sip:MAC%3a00135E874B49@intern.snom.de>;tag=658512961
```

```
From: <sip:MAC%3a00135E874B49@intern.snom.de>;tag=91955270
```

```
Call-ID: 1930770594@192.168.10.67
```

```
CSeq: 3 NOTIFY
```

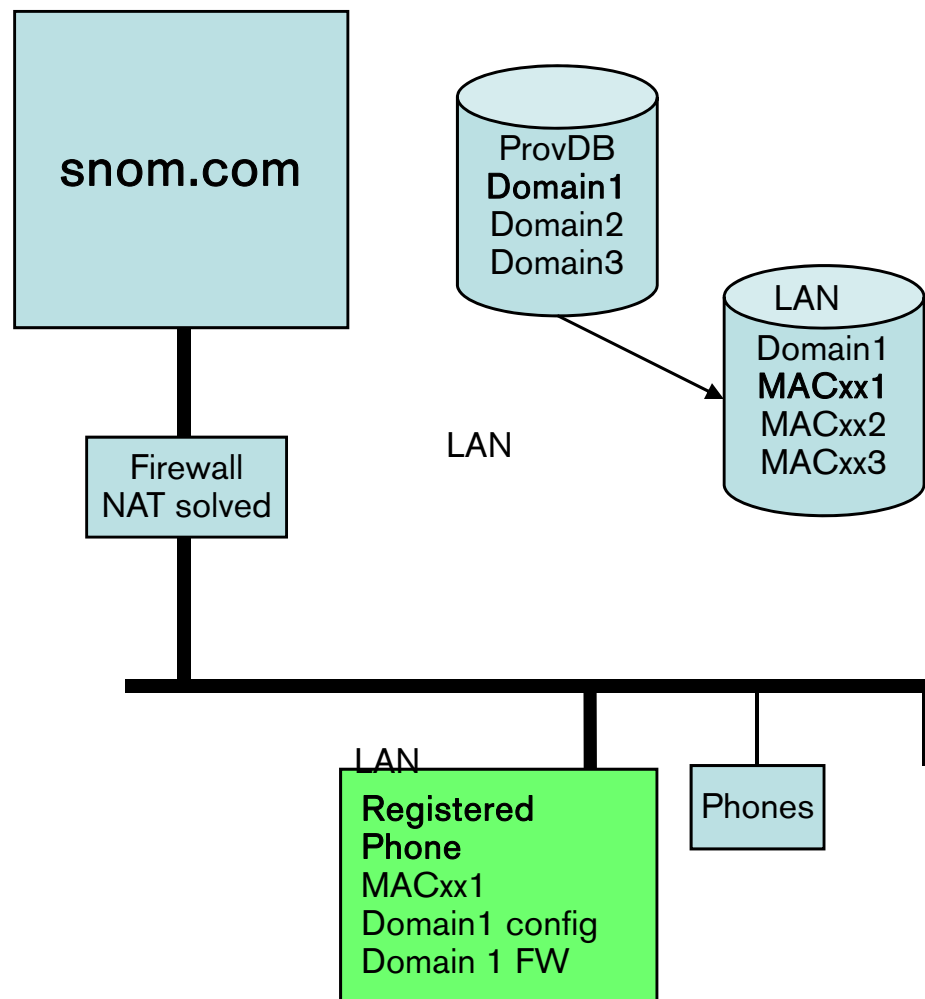
```
Content-Type: application/url
```

```
Subscription-State: terminated;reason=timeout
```

```
...
```

```
http://192.168.100.10/sipphone/sipphoneconfig.xml?mac={ mac }
```

- ❶ Snom phones contact snom provisioning server first (hardcoded in FW):
 - <http://provisioning.snom.com/snom3x0/snom3x0.php?mac={mac}>
 - Settings script does not deliver any settings back to the phone
- ❷ Snom partner may request SSH accounts to redirect the setting server URL to their own setting server
- ❸ Redirection is based on MAC address, registered MAC addresses will be redirected



Customer SSH account

```
Welcome, account! Type help for help.
==> help
Welcome to the snom configuration tool.
You may use the following commands:

SHOW <mac>      : Show the status of a phone.
REGISTER <mac>  : Register a phone.
REG <mac>       : Same as REGISTER.
DEREGISTER <mac>: Deregister a phone.
LIST            : List all phones assigned.
BYE            : Leave this tool.
```

A MAC address may be entered as 3 to 6 digit hexadecimal number, case does not matter (e.g. 2e4 --> 0004132202E4)

```
==> list
000413101214 00041310123C
```

- ❶ Environments with few phones or without DHCP
Server option 66 / 67 available
- ❷ Change the Setting URL field manually via the web or
phone user interface

Update:

Update Policy:

Setting URL:

Subscribe Config: on off

PnP Config: on off

- ① Setting URL can be hardcoded for large scale OEM projects
- ① Assures full control over the phone since each factory reset will point to the designated OEM setting server