Alcatel·Lucent Enterprise

Getting started with the 8378 DECT IP-xBS solution on OXO

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Preface

This manual is valid for 8378 DECT IP-xBS.

The document is intended to be read by the ALE business partner as the framework document to have a quick understanding of the solution. The document will allow to understand how to make simple deployments without need to read any other document. For more complex deployments link to other documents are provided so that the reader can know where to find detailed explanations.

Pre-requisite is that the business partner has already a good knowledge on how to install an Alcatel Call Server.

See the Wizard section to understand which IP-xBS features you should use on the foreseen deployment.

See the How to configure the solution section for a simple deployment explanation.

See the Frequently Asked Questions section to demystify the solution.

It is recommended to display bookmarks (click on bookmark icon or Ctrl-B) on your favorite pdf reader to have an optimal navigation in the document.

1 Overview

The 8378 DECT IP-xBS (also known as xBS) is an ALE mobility solution connected on the IP network and using DECT technology to connect handsets. It is entirely managed by ALE Call Servers, there is no need of any external server.

It allows to have up to 80 xBS.

2 Documentation

These documents are all available in the Alcatel-Lucent Enterprise Business Portal: Entering the keyword “xBS” in the Search will allow to retrieve all the documents tagged with Feature xBS.

OXO documents can be found using the PACK_OXO_CONNECT_3.0_EN_TS:

using the taxonomy excel file TAXO_PACK_OXO_CONNECT_3.0_EN_dd-mm-yy_hh-mm-ss
filter on the Theme “Expert Documentation”
then on the Feature “xBS”
then clicking on TDL URL to retrieve the selected document

Documents can be found using the external hypertext links underlined in blue (if not broken due to a potential change of the document repository). All the external links of this document are grouped on this page.

[1] OXO Mobility document 8AL91204USAE

[2] DECT, IP-DECT and IP-xBS DECT Engineering rules and Site Survey Kit Manual 8AL90874USAA

[3] DECT and Wireless LAN networks cohabitation TC0488

[4] 8212 DECT handset release note TC2179en

[5] 8232 DECT handset release note TC1772en

[6] 8242 DECT handset release note TC1942en

[7] 8262 DECT handset release note TC2150en

[8] https://ebuy.businesspartner.alcatel-lucent.com/codepari/menu_paricode.aspx

[9] IP Touch issues TG0028

[10] Tools and methods to investigate issues over IP network TG0055

3 List of abbreviations and acronyms

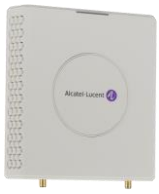
ALE	Alcatel-Lucent Enterprise
AVA	Automatic VLAN Acquisition
BO	Branch Office
CS	Call Server
DECT	Digital Enhanced Cordless Telephony
DHCP	Dynamic Host Configuration Protocol
DLC	DECT Data Link Control Layer
DOC	Document
EHO	External Handover
FW	Firmware
GAP	Generic Access Protocol
IBS	ALE Intelligent Base Station (6 simultaneous communications)
IP	Internet Protocol
LAN	Local Area Network
LTE	Long Term Evolution standard
OMC	OXO Management Console
OXE	OmniPCX Enterprise Call server
OXO	OmniPCX Office Call Server
PARI	DECT Primary Access Right Identifier
PLI	DECT Park Length Indicator
RBS	ALE Remote Base Station (12 simultaneous communications)
RPN	DECT Radio Part Number
RSSI	Radio Signal Strength Indicator
SIP	Session Initiation Protocol
SUOTA	Software Upgrade Over The Air
SW	Software
TC	ALE Technical Communication available on the Business Portal
TBC	To Be Checked
TDM	Time-Division Multiplexing (legacy wired transport technology)
TFTP	Trivial File Transfer Protocol
TKC	Technical Knowledge Center available on the Business Portal
VLAN	Virtual Local Area Network
WBM	Web Based Management
WIFI	Wireless Fidelity
xBS	8378 DECT IP-xBS nickname

4 Solution components description

4.1 8378 DECT IP-xBS hardware

There is an indoor version with integrated antennas.

There is an indoor version with external antennas connectors. The external antennas are not provided with the product (external antennas for 8378 DECT IP-xBS are the same as external antennas for TDM Base stations IBS, see the ALE catalog to have the list of available external antennas).



There is an outdoor version with external antennas. The external antennas are provided with the product but can be changed thanks to connectors.

4.2 ALE compatible Call Servers

The IP-xBS solution is integrated with OXO CONNECT EVOLUTION CS and OXO CONNECT CS and their embedded DHCP and TFTP servers. By default, the embedded DHCP and TFTP servers are well configured to serve the xBS.

4.3 DECT handsets

ALE AGAP DECT handsets (8232, 8242, 8262, 8262 Ex) and ALE GAP DECT handsets (8212) are supported.

Third party GAP DECT handsets can be used but Business Partner is responsible about technical aspects.

5 Wizard OXO

The wizard hereunder will help to understand which IP-xBS features you should use on the foreseen deployment.
For an easy deployment only few concepts like PARI CREATION, DYNAMIC IP CONFIGURATION, xBS AUTO-DISCOVERY, AUTOMATIC AIR SYNCHRONIZATION are used and most of them are automatic.

Conditions for easy deployment:

- ✓ Less than 80 xBS
- ✓ Continuous buildings with no interruption of air synchronization (no branch offices)
- ✓ No mix with TDM BS
- ✓ Dynamic IP parameters (CS and xBS are placed in the same DHCP domain)

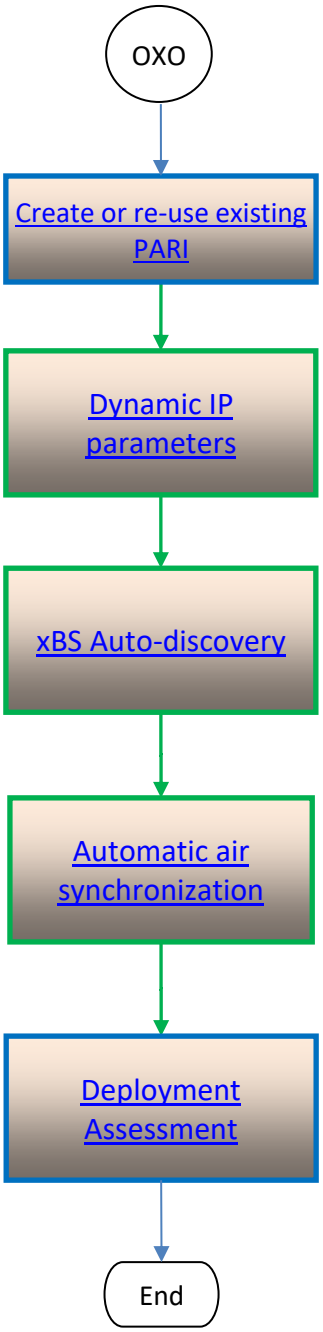
If any of the above is not fulfilled, it becomes a complex deployment.

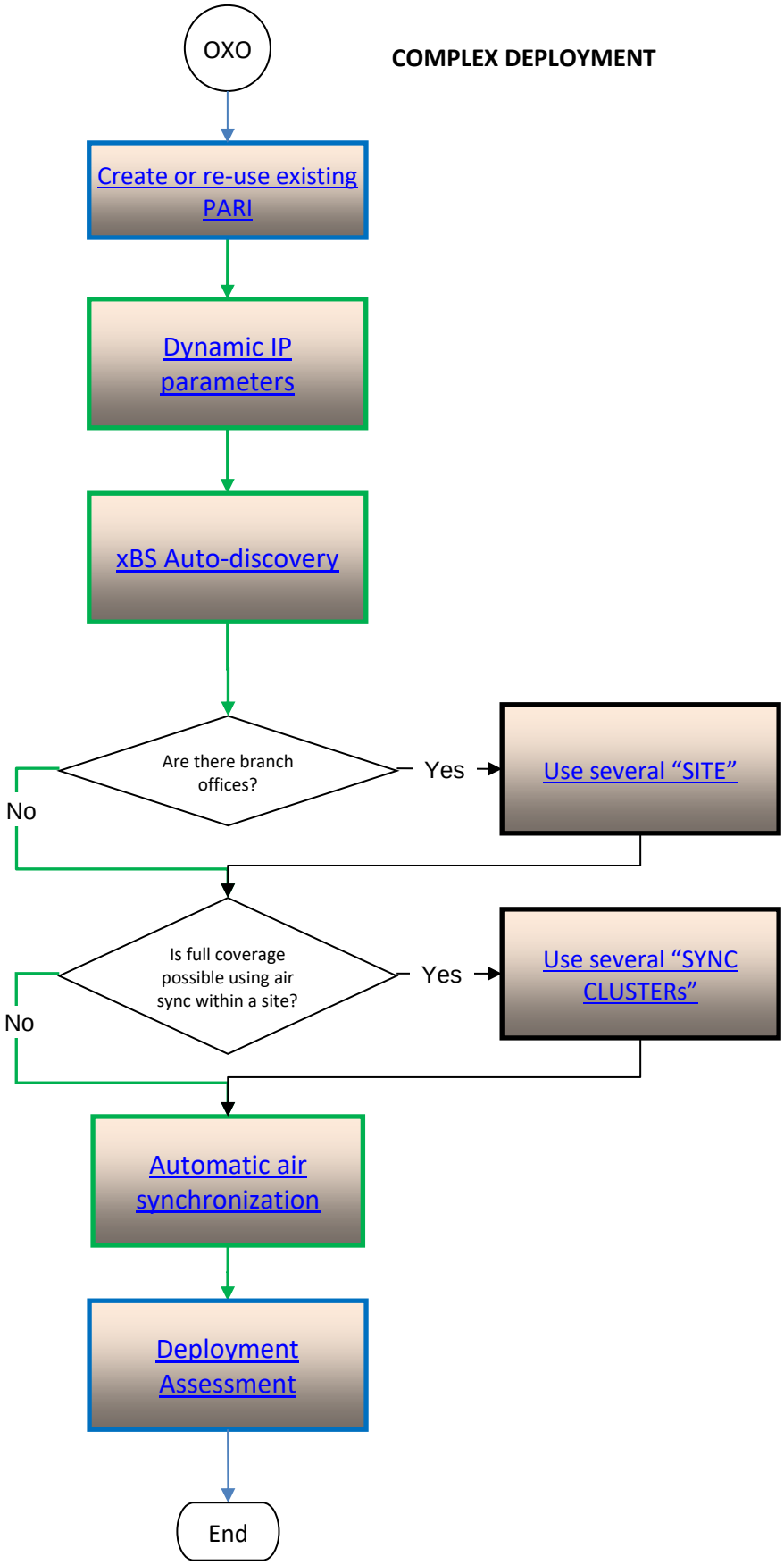
For a more complex deployment additional concepts like SYNC CLUSTER, SITE could be used.

Before using the wizard hereunder, you must have an idea of the number of base stations needed in the deployment. It can be estimated based on the buildings dimensions, the number of users and the needed traffic thanks to the rules given in the doc[2]

Note: It is recommended to first work on a paper plan and do a site survey in areas where air synchronization could be difficult to achieve. Even with only a few 8378 DECT IP-xBS it is recommended to do a site survey.

EASY DEPLOYMENT




OXO
COMPLEX DEPLOYMENT
Create or re-use existing PARI
Dynamic IP parameters
xBS Auto-discovery
Are there branch offices?
Yes
No
Use several "SITE"
Is full coverage possible using air sync within a site?
Yes
No
Use several "SYNC CLUSTERs"
Automatic air synchronization
Deployment Assessment
End

5.1 IP-xBS PARI creation

Before configuring the Call Server, a PARI (<= 80 xBS) must be obtained on the ALE Business Portal.

PARI numbers are managed on site through the eBuy "DECT installations management (PARI codes)" page, follow the link[8]: https://ebuy.businesspartner.alcatel-lucent.com/codepari/menu_paricode.aspx (restricted access).
PARI is given in octal (TDM DECT) and in hexadecimal (IP-DECT) format.

These PARI will represent the identity of the DECT system for a group of up to 80 xBS.

OXO OMC PARI configuration:
There is only one PARI in the system shared between IP-xBS and TDM IBS base stations

⇒ OMC → Dect → DECT / PWT ARI / GAP → ARI

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5.2 xBS auto-discovery

The xBS connected on the IP network are automatically discovered by the call server (given they are in the same broadcast domain as the CS) either for an initial deployment or for an addition of new xBS to existing deployment. Only a very reduced configuration is needed on call server. This automatic discovery needs to be first enabled on CS side and is limited in duration.

OXO auto-discovery activation must be done here:

⇒ OMC → Subscribers / Base stations List → Auto Provision

After clicking « Activate Temporarily » in menu Auto Provision, the system is ready to accept new IP equipment.

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5.2.1 Manual xBS deployment

xBS can also be manually provisioned in the Call Server before being connected to the network. After configuring SITE, PARI, the base station's MAC address must be configured manually:

On OXO:

- Create an IP terminal:
  ⇒ OMC → Subscribers / Base stations List → Add → IP-xBS (Base Station)
- Enter MAC address in the subscriber details
- Optionally choose the site and the cluster to which the base station will be attached

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5.3 Automatic air synchronization

The DECT base stations transmissions need to be time aligned in order that a DECT handset can perform roaming and handover between the bases. To achieve time alignment of xBS, the synchronization by air is used. The xBS can synchronize by air to other xBS provided that they are close enough to each other (see doc[2])

The air synchronization tree calculation is automatic.

An automatic air synchronization tree can be composed of a maximum of 80 bases belonging to the same PARI and the same SITE. The tree supports a maximum of 24 levels (hops).
There is one internal synchronization tree per SITE per PARI.

The tree root is called SYNC MASTER, the algorithm calculates which xBS is the best to become the SYNC MASTER at a given instant. When the radio environment changes, the position of the SYNC MASTER and the shape of the tree may change automatically. The calculation of the tree is made continuously and the tree changes if we add base stations, or if a better tree is calculated as a function of the RSSI levels than as a function of the number of hops. The change of the tree has no impact on the on-going audio communications.

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5.4 SYNC MASTER

Definition:
A SYNC MASTER is the 8378 DECT IP-xBS root of the internal synchronization tree.

Characteristics:
The SYNC MASTER is the one being the root of the synchronization tree. It is selected automatically by the air synchronization algorithm.

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5.5 SITE

Definition: A SITE is a group of 8378 DECT IP-xBS located in the same geographical location where it is possible to do handover.

Purpose: It allows to distinguish for example a Head Quarter from Branch Offices using a different SITE Number Id.

Characteristics:

Roaming is possible between SITEs (HQ SITE 1 and BO SITE 2 for ex.), handover is not possible.

The SITE mandatory component is the 8378 DECT IP-xBS which has the role of DATA SYNC PRIMARY. It is automatically selected by the CS.

When handover is not requested (for example between head quarter and branch office) then 8378 DECT IP-xBS infrastructure are separated on different SITEs to minimize the IP network traffic between the 8378 DECT IP-xBS.

The number of possible SITEs is 20.

By default, all xBS are in the same SITE. The SITEs are defined by the system administrator who may also change the assignment of an xBS to a SITE.

There is one internal synchronization tree per SITE per PARI. This tree can be composed by several islands spread in several SYNC CLUSTERs.

Trees are not shared between SITEs. Trees are not shared between PARIs

Example 1: PARI is shared between two SITEs (HQ and BO)

On OMC you can change the SITE number associated to an xBS in the detailed settings of this xBS.

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5.6 DATA SYNC PRIMARY

Definition:

The DATA SYNC PRIMARY is an 8378 DECT IP-xBS in charge of synchronizing the data between all the 8378 DECT IP-xBS of a SITE (including the time synchronization tree). Its role is to centralize all data and to copy them to all 8378 DECT IP-xBS attached to it.

Purpose: Handover is only possible between data synchronized xBS thanks to the DATA SYNC PRIMARY.

Characteristics:

There is a single DATA SYNC PRIMARY per PARI inside a SITE.

The DATA SYNC PRIMARYs are automatically assigned by the Call Server.

The Automatic Redundancy of DATA SYNC PRIMARY is managed by the Call Server. In case of failure of the DATA SYNC PRIMARY, the Call Server selects a new one and notifies the other xBS of the SITE.

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5.7 SYNC CLUSTER

Definition: A SYNC CLUSTER is a set of 8378 DECT IP-xBS which are synchronized (time aligned) together at the DECT radio interface.

Purpose: A chain of SYNC CLUSTERs allows to constrain the way the xBS are synchronized together. The use of SYNC CLUSTERs is reserved to problematic and exceptional situations. It is recommended to request help to ALE technical support before using them.

See doc[1] and doc[2] for more details.

5.8 Internal Synchronization

Definition:

A set of 8378 DECT IP-xBS inside the same SITE which are synchronized (time aligned) together are known as using INTERNAL SYNCHRONIZATION.

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5.9 RELAY xBS

Definition:

The RELAY xBS is the 8378 DECT IP-xBS where the IP audio communication (using the RTP protocol) is established with the distant phone and where the signalization is established. It relays the audio communication and the signalization to the xBS where the handset is moving.

Characteristics:

The RELAY xBS does not necessarily handle the radio link with the handset.

A single 8378 DECT IP-xBS can handle up to 11 relays.

5.10 RELAY xBS load sharing

Definition:
The IP-xBS solution is using RELAY xBS load sharing by choosing a low loaded xBS inside the same SITE to establish the media and the signalization. This will avoid any RTP resources saturation in an 8378 DECT IP-xBS where the communication traffic is high.

Characteristics:
The RELAY xBS is the base station where the DECT DLC layer is running for a given handset whatever the handset location.

6 Engineering rules

The DECT Engineering rules are described in detail in the document [2]

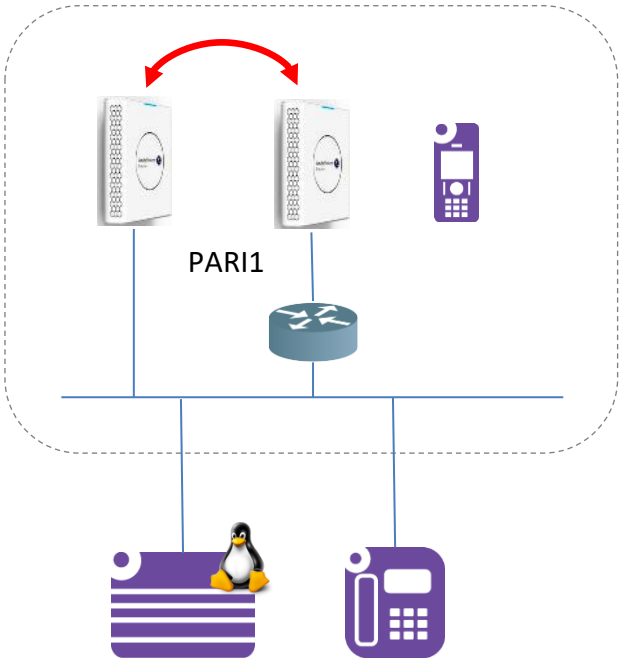
7 Possible Deployment Topologies

Connection handover

Roaming

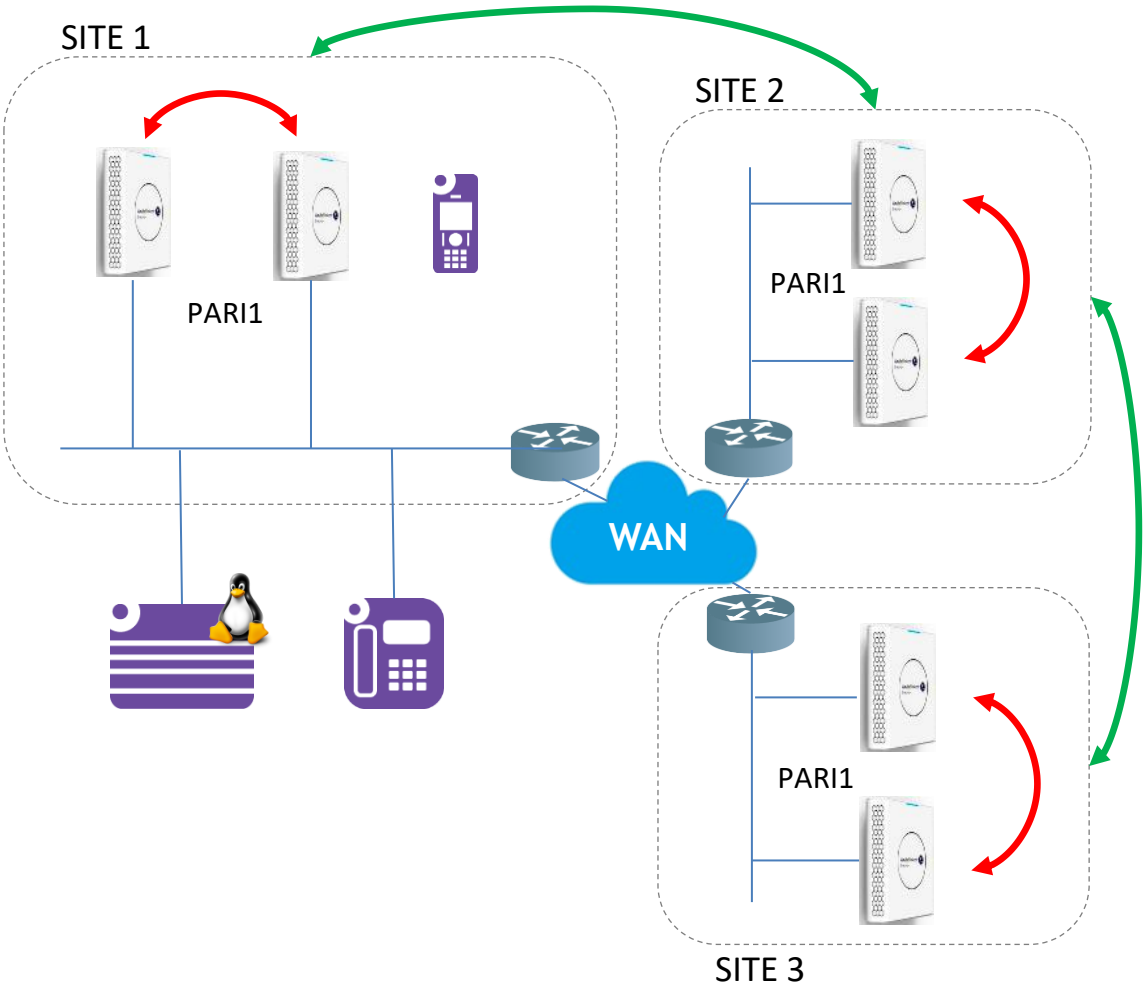
7.1 xBS only

Mono-PARI, 80 IP-xBS max, one node



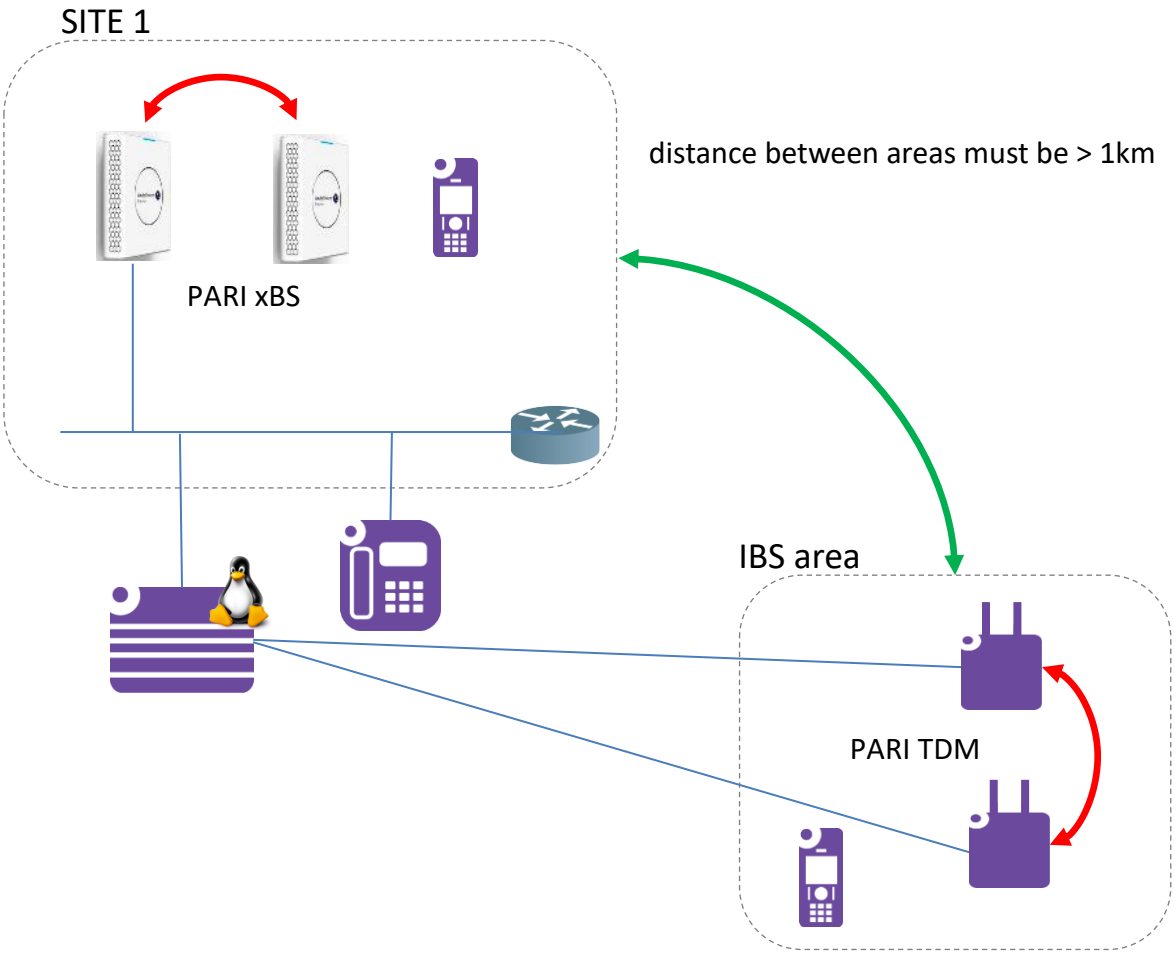
7.2 xBS only, Headquarter & Branch Offices

(mono PARI, one node, 80 IP-xBS max). No radio overlap between the SITEs.



7.3 Mixing xBS / TDM BS without external synchronization

OXO, roaming between xBS and IBS (mono PARI, one node, 80 xBS)



7.4 Non-supported configurations

- Two Sync Clusters with two separate synchronization trees and not separated by more than 1km: Because of possible radio overlap, the handsets will stays locked to the initial Sync Cluster, even with very low RSSI level. If a user moves towards the other Sync Cluster, his handset will not lock to xBS from the other Sync Cluster as they don't detect them (xBS from the other Sync Cluster are not synchronized with the initial Sync Cluster). Consequently, handsets will have poor or no audio because they remain locked to xBS from the initial Sync Cluster which is far but still slightly reachable by radio, even if they are much closer to xBS from the other Sync Cluster.

- As a general rule, all xBS at the same geographical location must be synchronized together (time-aligned) to prevent this kind of unexpected behavior. The condition to have xBS not synchronized is that they belong to separate geographical locations without radio overlap, in other words two locations separated by more than 1km.

8 How to configure the solution

8.1 Limited constraints on IP network

Excepted typical constraints linked to VoIP deployments there are:

No need of any external server, the ALE call servers are managing the whole solution.

No need of multicast aware router, unicast is used between base stations themselves and between base station and call server.

No need to use external DHCP and TFTP server when the CS embedded DHCP and TFTP servers are used.

No subnet aggregation constraints as Head Quarter versus Branch Office differentiation is not based on subnet addresses. There is no need to reconfigure any existing IP subnet addresses to match 8378 DECT IP-xBS rules.

8.2 Dynamic or Static IP parameters

It is possible to use the CS embedded DHCP server. There is no configuration to do on theses servers.

It is possible to use external DHCP server. The external DHCP server can be configured with the IP-xBS vendor class id set to *alcatel.ipxbs.0* and TFTP server's IP address set in the DHCP *next-server* field.

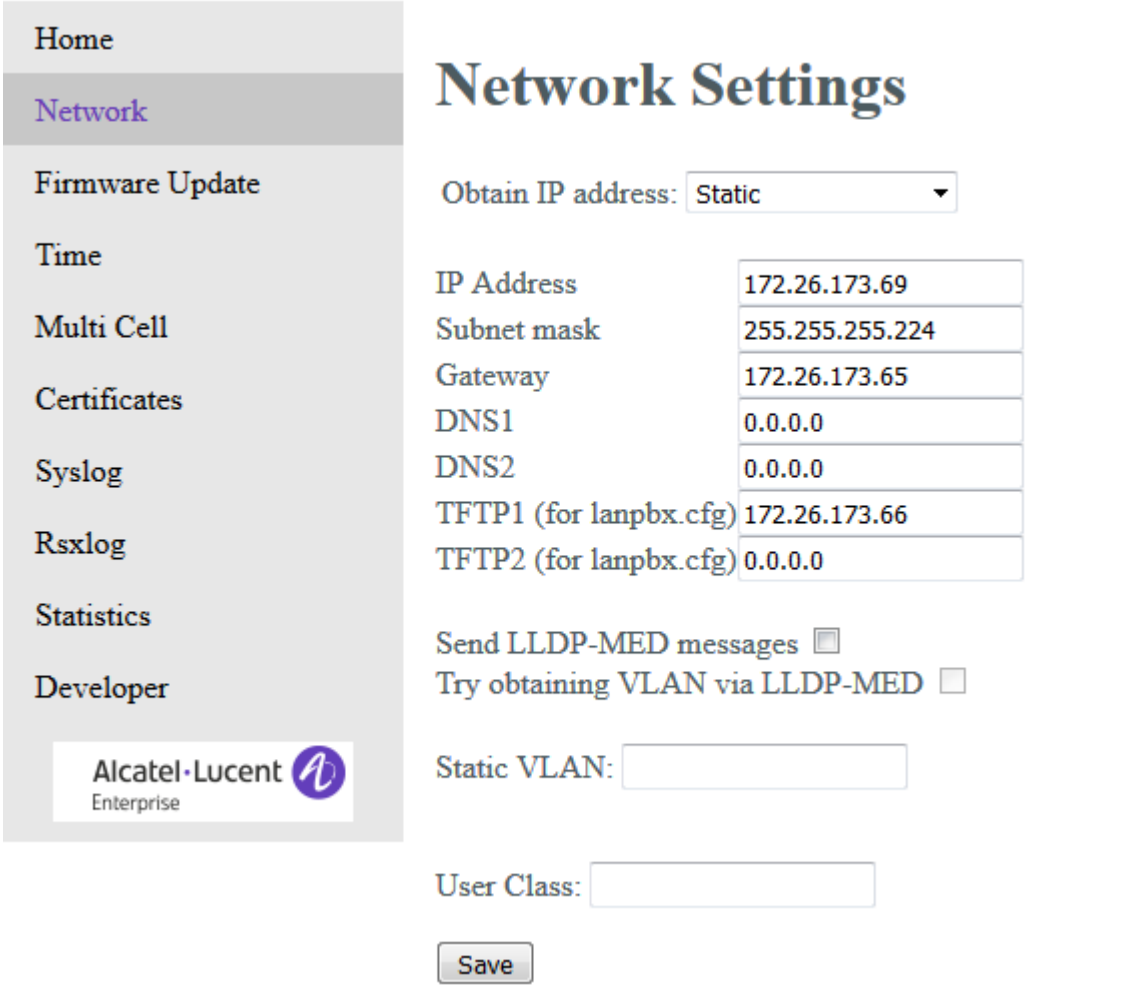
By default, xBS initializes dynamically and retrieves IP information automatically.

You can use static IP parameters each time there is no possibility to have a DHCP server locally for example in a branch office.

If you want to configure the static IP parameters:

- Either you can connect a PC directly to the xBS using a straight or a crossed ethernet cable and press on the xBS reset button for 6 to 10s, you will be able to connect to the base with a browser on the PC using the address 192.168.0.2 and the default login credentials (don't forget to connect the xBS to the PC via a PoE power injector and to configure the PC LAN card IP parameters in static in the same subnetwork 192.168.0.1 mask 255.255.255.0 for example).

- Or if the xBS has already got an IP address through DHCP and using the site survey mode of a handset (accessible through *service* in the handset menu), you can retrieve the RPN of the xBS you are close to. In the Call Server device management, you can find the IP address and MAC address corresponding to this RPN. The xBS need to be connected to a CS to be able to retrieve its IP address. If not connected to a CS, the IP address could be retrieved in the log of the DHCP server if you know the MAC address of the xBS which is written on its label.



There is also the possibility to enter via the xBS WBM a DHCP user class. Using this option 77 allows network administrators to define groups of xBS, and to attach groups to different and independent Call Servers (i.e. CS that are not interconnected) by affecting to xBS the appropriate IP parameters, typically different TFTP server addresses for them to download their configuration from. Alternatives would be to use VLANs or create one entry per xBS on the DHCP server, but both bring more constraints. Groups are defined on the DHCP server by creating classes of DHCP clients depending on the DHCP User Class option content. This possibility depends on the DHCP server capabilities, but should be available on most DHCP servers

By default, the xBS DHCP setting is set to Any-DHCP:

- Any-DHCP: DHCPOFFER from ALE DHCP servers are preferred (Vendor specific option set to alcatel.a4400.0).
  If there are no DHCPOFFER from Alcatel servers, all DHCPOFFER are examined.

- Alcatel-Only: Only DHCPOFFER from ALE DHCP servers are examined.

OXO DHCP server configuration could be modified here:

⇒ OMC → Hardware and Limits → LAN / IP Configuration → DHCP

8.3 TFTP

The embedded TFTP servers must be used to take benefit of the auto-discovery feature. The TFTP server address is given to the xBS by the DHCP server.

It is not possible to use any external TFTP server.

8.4 VLAN

A network can be segmented with VLANs. VLANS (defined by IEEE 802.1q) must be used at switch level:

- to identify and prioritize voice flows (with QoS mechanisms),
- to reduce the broadcast domain for the ports belonging to the VLAN and/or
- to carry the prioritization and VLAN identifications between switches

Generally, a VLAN policy is already implemented throughout the customer network and it is based on port, MAC address, IP sub-net, etc.

VoIP deployment must either follow the existing VLAN policy rules or if any, a Voice VLAN(s) must be configured. The use of VLAN for VoIP is recommended to separate RTP and associated SIG traffics from the data traffic (from data broadcast traffic for ex.). It is generally called “Voice VLAN”. The Call Server embedded DHCP server will send to the xBS the Voice “VLAN id” to use.

VLAN can also be configured via the switch using the LLDP protocol or using the WBM or via DHCP option 43 sub-option 58.

In case of one VLAN for all xBS, the network infrastructure products must be sized and configured in terms of:

- Bandwidth: infrastructure network equipment must be able to handle the traffic generated by xBS especially during their initialization.
- ARP table: the ARP table of the infrastructure network equipment must be sized to handle the xBS ARP requests.

xBS VLAN tagging (through the WBM) is not necessary because contrary to an IP phone there is no PC connected behind the xBS. The VLAN assigned to the xBS will be done by the switch itself. The switches must be “managed” switches to support VLAN.

8.5 LANPBX.CFG configuration file

The xBS downloads the lanpbx.cfg file from the embedded CS TFTP server. This file contains the IP addresses of the CS.

It is exactly the same lanpbx.cfg file as for ALE IP-Phones.

8.6 xBS firmware binary

The xBS firmware binary (binipxbs) is delivered with the call server binary package. The xBS is using TFTP to retrieve this file during start-up. The deployment of a new firmware binary will be done on all the xBS. It is possible to forbid the upgrade on a specific xBS via its WBM interface (nevertheless it is highly recommended that all the xBS in a deployment have the same FW release). The firmware binary file is signed.

8.7 QoS

QoS mechanisms must be used for implementing an optimum VoIP architecture. QoS policy must be deployed across the whole data network (including the switches and routers).

For an optimum audio quality, the network round trip delay, the packet jitter, the packet loss rate must be known and bounded. For example, a round trip delay less than 150ms, jitter less than 20ms and packet loss less than 1% will allow a very good audio quality (subjective MOS score of 4).

QoS L2 and L3 Type of Service (ToS) /Differentiated Services Code Point (DSCP) / Differentiated Services DiffServ can be configured in the Call Server. The defined values will be given by the CS to the xBS during its initialization.

IEEE 802.1 p/q (same value for voice and signaling flows) can be configured on CS server and on xBS.

TOS/Diffserv tagging (same value for voice and signaling flows) can be configured on CS server and xBS.

OXO QoS Layer 3 could be modified here:

⇒ OMC → Voice Over IP → VoIP: Parameters → General → IP Quality of Service

OXO QoS Layer 2 could be modified here:

⇒ OMC → Hardware and Limits → LAN / IP Configuration → LAN Configuration

⇒ OMC → Hardware and Limits → LAN / IP Configuration → Priority Mapping

8.8 Security

There is no DECT ciphering on OXO

The configuration of IP security:

There is no security on IP side on the first release. Only the xBS FW is signed and the WBM access has credential (login/password).

8.9 Call server configuration

OXO/OMC configuration: More details can be found in the "OXO Mobility" documentation [1]

The IP-xBS solution is available since R3.0.
All the requested files and binaries are part of the OXO Call Server software delivery.
The configuration is completely managed by OMC.

To complete a simple IP-xBS deployment, the following steps must be followed:

1) Configure a DHCP server:
   IP-xBS base stations get their IP address from the DHCP IP Range of the ALU IP Phones.
   ⇒ OMC → Hardware and Limits → LAN / IP Configuration → DHCP

2) Set the PARI of the system:
   ⇒ OMC → Dect → DECT / PWT ARI / GAP → ARI

3) Activate the "auto provisioning" for IP phones:
   ⇒ OMC → Subscribers / Base stations List → Auto Provision
   Note: IP-xBS base stations can also be manually provisioned in the Call Server

4) Plug at least one IP-xBS base station (will become the Data Sync Primary IP-xBS in the first site)

   IP-xBS base stations are automatically provisioned in the Call Server when requesting their configuration file startipxbs-<@MAC>.
   The base station is created with the MAC address defined in the name of the requested file and the received source IP address.
   The new base station is attached to the first cluster in the first site.

5) Add handsets (see section 5.2.6)

   DECT handsets must be created in the Call Server by the means of OMC before registering them to the DECT subsystem (IP-xBS and TDM IBS). The provisioning of DECT handsets is the same for IP-xBS and TDM-IBS. A handset registered over an IP-xBS or TDM IBS is also operational with the same level of services when connected to a TDM IBS respectively IP-xBS.

   Create a DECT access:
   ⇒ OMC → Subscribers / Base stations List → Add → Dect set

Register the DECT handset:
⇒ OMC → Subscribers / Base stations List → GAP Reg

Start the registration on the DECT handset.
Associate the registering handset with the previously created DECT access on OMC.
After registration, the handset is inventoried as a DECT handset type (e.g. 8242 DECT…).

9 DECT handsets compatibilities

Handsets compatibilities:

DECT handsets release notes can be found via the taxonomy files in the TC_OXE_12.0_EN sheets

8212 DECT handsets from R100	see doc[4]
8232 DECT handsets from R140 (v41.83)	see doc[5]
8242 DECT handsets from R130 (v61.82)	see doc[6]
8262 DECT handsets from R210 (v54.81)	see doc[7]
8262 EX DECT handsets from R210 (v74.81)	

Call server compatibilities:

See the handset releases notes listed above

10 How to assess a simple deployment

Install the DECT handsets using OMC (same procedure as subscribing a handset on a TDM base station).

Using WebDiag tool to see if the synchronization tree is what is expected to be (all bases stations are present in the tree; the tree has a single Sync Master). Analyzing the traffic counters available in WebDiag after a period of observation will allow to detect any base station overcharge.

The complex deployments will be assessed using the same tools but with a deeper look inside the site or cluster.

If something is wrong or not as expected, please use the tools described in section0 to know how to identify and solve the issue.

11 Troubleshooting tools

11.1 xBS LED state description

The table below summarizes the various LED states:

STATE	LED STATE
No power in unit	UNLIT
Base station alive – normal operation power	GREEN LED blinked 1s On/1s Off
Reset in Progress	Flashing RED LED (100ms on, 100ms off)
Error detected in Self-test	SOLID RED

The table below summarizes the LED behavior during the start-up sequence:

STATE - During the Initialization Phase	LED STATE
Step 0: Self-test and OS initialization	Unlit and Solid red displayed if error detected
Step 1: Network initialization	RED LED blinked 100ms On and 3000ms Off
Step 2: IP parameters acquisition	RED LED blinked 100ms On/400 ms Off/100ms On and 3000ms off
Step 3: Configuration file	RED LED blinked (100ms On/400 ms Off/100ms) *2 and 100ms On and 3000ms off
Step 4: Software download	ORANGE LED blinked 100ms On and 3000ms Off
Step 5: Call server link setup	ORANGE LED blinked 100ms On/400 ms Off/100ms On and 3000ms off
Step 6: Base configuration by call server	ORANGE LED blinked (100ms On/400 ms Off/100ms) *2 and 100ms On and 3000ms off
Step 7: Configured, but base is being synchronized and starting DECT	GREEN LED blinked (100ms On, 100 ms Off, 100ms on, 1000ms off)

11.2 Serviceability tools existing on OXO/OMC (webdiag)

When connecting to OMC with the class of client = User (installer) an access through a browser to display the DECT IP-xBS base stations is provided:

- It provides an interface to them:
  - list of sites, data primary name and RPN of a site, number of operational base station in each site, number of nonoperational base station in each site.
    view the list of base stations in a site
    view synchronization tree including all the IP-xBS base station of a site.
  - list of clusters in a site, number of operational base in cluster, the number of nonoperational bases in a cluster, list of base stations in each cluster, view of synchronization tree belonging to the given cluster.
  - Detail of each selected base station: syslog configuration and syslog output, internal settings output, internal trace filter configuration, statistics output, reset
- It displays the list of active DECT handsets, their link status, on which base they are synchronized, which is the relay base.
- It displays the statistics counters for the DECT base stations and the handsets.

11.3 IP troubleshooting tools

The 8378 DECT IP-xBS use the same IP protocols than IP Touch phones. Some troubleshooting tools used with IP Touch can be re-used.

See the document[9] “IP Touch issues”

See the document[10] “Tools and methods to investigate issues over IP network”

Use Wireshark tool with the UA/UDP/IP-xBS dissector

Use CS TCPDUMP

12 Frequently Asked Questions

Note: The Technical Knowledge Center available on the Business Portal can also be consulted to find answers to known problems.

MIGRATION from TDM to IP-xBS:

Do I have to register again the already installed handsets on a TDM infrastructure?

No, the already installed handsets will be able to roam to 8378 DECT IP-xBS without any new registration

Do we need a new handset release to interwork with xBS?

Yes, for the handsets bought before the IP-xBS general availability date.

Can I directly replace an TDM BS with an xBS?

No, xBS and TDM base stations are not supposed to be mixed up everywhere, because you must respect the minimal distance of 1km between the TDM base stations and xBS.

Do I need to upgrade my call server for xBS?

Yes, it is mandatory.
“OXO CONNECT” and “OXO CONNECT EVOLUTION” minimal version is R3.0

DEPLOYMENT of 8378 DECT IP-xBS:

When do we need to make a site survey?

It is recommended to first work on a paper plan and do site survey in areas where air synchronization could be difficult to achieve. Even with only few 8378 DECT IP-xBS it is recommended to do a site survey.
See the doc[2] for more details.

How to calculate the number of xBS needed in a deployment? Where to put them?

Each base station must see another one with a least a level of -80dBm. It is better to put the 8378 DECT IP-xBS in line of sight to have a stable radio environment. The coverage rules are the same as for 8340 IP-DECT DAP.
See the doc[2] for more details

When using external antennas?

When a level of directivity is needed, you can replace internal omnidirectional antennas with external directive antennas on indoor 8378 DECT IP-xBS (version with antenna connectors) and on outdoor 8378 DECT IP-xBS. When using antennas with high gain, the Nominal Transmit Power must be reduced by an amount equal to the antenna gain minus 3dB in the US only. In most of the directive antenna use cases, the antenna diversity should be removed via the CS interface (only ANT0 is active, bottom right one when looking the xBS with its LED at the top).
See the doc[2] for more details

When to use outdoor bases?

On outdoor areas. They are weather-protected and have a greater temperature in-use range. They should be protected against lightning surge, see more details in doc [1].

Cohabitation with other radio: Distance between WIFI and DECT and between LTE and DECT?

A minimum distance between two radio technologies must be respected. If this distance cannot be fulfilled additional filtering on the DECT antennas may be required.
Without filter a minimum distance of 250m between LTE antenna and the xBS antennas must be fulfilled. By configuring the CS to forbid the use of frequency channels 7, 8 and 9, this minimum distance can be reduced to 70m.

Can I use local power supply with non-PoE compatible switches?

No, the IP-xBS must be supplied over Ethernet. A local power injector can be used to provide the energy.

Do we need 1Gb/s switches?

The IP-xBS has a 10/100 Mb/s interface and can be plugged on a 1Gb/s link without any problem (the link will be downgraded to 100Mb/s).

Can I install and switch on all the xBS at the same time?

You can install all the 8378 DECT IP-xBS at the same time and switch them on at the same time on simple deployment (mono-PARI). See also section 5.9

Shall we declare the xBS in the call server?

The 8378 DECT IP-xBS are auto-discovered without any provisioning on CS side (except for the general settings).
You can also declare the 8378 DECT IP-xBS manually on the CS device management if you prefer. See section 5.2.1

Should I need to configure something on the xBS web interface?

No, all the parameters are configured on the CS side, except if you want to configure the 8378 DECT IP-xBS to use static IP parameters and/or a static VLAN and/or DHCP User Class.
See doc[1]for more details.

How to find the IP address of an xBS?

Using the site survey mode of a handset you can retrieve the RPN of the xBS you are close to. In the Call Server device management, you can find the IP address and MAC address corresponding to this RPN. The xBS need to be connected to a CS to be able to retrieve its IP address. If not connected to a CS, the IP address could be retrieved in the log of the DHCP server if you know the MAC address of the xBS which is written on its label.

Do I need to configure a DNS for the xBS?

No, the 8378 DECT IP-xBS, like the ALE IP Phone can work without any DNS server.

AIR SYNCHRONIZATION:

See more details in doc[2]

Why the sync master change from one base to another one?

With automatic air synchronization, it is the 8378 DECT IP-xBS sub-system which selects the best 8378 DECT IP-xBS acting as the Sync Master. So, it is normal that the Sync Master can change.

How to stabilize an unstable air synchronization tree? How can I detect unstable air sync tree?

Unstable air synchronization is due to unstable radio environment and due to a bad deployment. The position of the 8378 DECT IP-xBS must be set to always have a stable radio environment (i.e. a door which when close break the synchronization link). Unstable air synchronization can be detected looking the number of Sync Master, looking the synchronization tree and associated RSSI level and looking the statistics. See doc[2] for more details.

How often a stable air sync changes its sync tree?

It is not abnormal that a synchronization tree changes ten times a day.

How much time the air synchronization will take to stabilize during initial startup?

It takes about 10min to build the first tree

How much time needs a tree to be reconfigured in case of modification of the environment?

The tree is reevaluated every 15 min.

Are the key synchronization components redundant?

Yes, natively as the synchronization is automatic.

FIRMWARE UDATE:

Can I upgrade the handset firmware by air on a xBS infrastructure?

No

Where do I find the xBS firmware? On the Business Portal?

No, it is embedded in the CS releases inside their TFTP server directory.

GEO-LOCATION:

I want to make geo-location using DECT, are the RPN of the xBS always allocated identically?

RPN remains identical between first allocation and any subsequent CS restarts.

SECURITY:

How to configure DECT security?

There is yet no DECT ciphering with OXO CONNECT CS.

How to configure IP security?

There is no security on IP side on the first 8378 DECT IP-xBS SW release. Only the 8378 DECT IP-xBS FW is signed and the WBM access has credential (login/password).

MISCELLEANOUS:

Is xBS a SIP base station?

No, the 8378 DECT IP-xBS is using a proprietary link for the interface with the Call Server. It is using a reliable UA/UDP socket.

How to get the PARI values? Using which tool? Are there free? How much should I get?

PARI value can be get on the BP web site (see link [8]). It is important that the PARI is different for each deployment.

Cable type? CAT3 telephony cable vs CAT5 data cable

The 8378 DECT IP-xBS works with CAT5 or UTP CAT6 cable compared to TDM base station which work with CAT3 cables.

What is the xBS power consumption?

The xBS is PoE class 2, consuming less than 6.49 Watts.

Are there crackles when I make handover between two bases inside a same PARI?

Inside a PARI, seamless connection handover is used.

How to easily find Technical Communication concerning DECT and more especially xBS?

Using the xBS keyword in any search within the Business Portal.

Are the DECT handset Notification and Alarming services still available when connected on xBS?

Yes, they are.

Are the old ALE handsets (MR100/200/300/400) supported?

No, these old handsets are obsolete and not supported on the 8378 DECT IP-xBS solution

Are third party DECT GAP handset supported on xBS?

They can be used but they are not supported.