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GUIDE

# Unify OpenScape Solution Set V10

## Dial Plan Implementation with WebCDC

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Administration Guide
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Mitel

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# 1 Dial Plan Implementation with Customer Data Collection Tool

## 1.1 Scope

The OpenScape Voice “Reference Architecture” is a concept that offers a standardized way of implementing OpenScape deployments, It is targeted at small and medium size customers with up to 2000 subscribers, but it may also be applied to large international customers. The Web Customer Data Collection tool (WebCDC) closely follows this Reference Architecture (also known as the ‘Standard Solution’) which includes WebCDC’s implementation of a reference dial plan.

This document provides an in-depth treatment of the reference architecture dial plan with concise explanations of its various underlying concepts and assumptions, as well as providing concrete examples for use of the WebCDC worksheets to construct specific dial plans according to the reference architecture standard. This document is intended as a supplemental aid to personnel that are responsible to configure dial plans via the WebCDC tool. It is also helpful to anyone that requires or desires a better understanding of the V8 OpenScape Voice reference architecture dial plan model.

**Background:**

The dial plan tables of the OpenScape Voice show a very high flexibility. The same routing targets can be reached through many different ways. In the past, each country or even each system integrator has developed its own way to configure an OpenScape Voice dial plan. Starting with V5, V6, V7 and continued in V8, the WebCDC tool provides a first step in the direction of a standardized way of implementing/ configuring dial plans for the majority of implementations.

The reference architecture applies the following principles:

- Easy to implement:
  The number of entries rises linearly with the number of sites even if toll restrictions are used. Other schemes show a quadratic increase instead.
- Easy to be expanded to large, international customers, good scalability.
  The dial plan accommodates large, international customer as well as small national customers.
- Easy to be expanded to new features
  The following routing related features are already pre-provisioned and just need to be switched on:
- Toll restriction (at the subscriber level via the Toll and Call Restriction service)

- DSS key usage (at the phone by configuring a key)
  The following routing related features are already pre-provisioned and can be switched off if needed:
- Subscriber rerouting (at site-level by removing the Survivable option from the proxies)

Routing decisions need to be made regarding the use of gateways:

- Tail-end hop-off
- Central gateway routing
- Easy to add a new site
  A new site only requires one new private numbering plans and a few entries in the Common Numbering Plan. It does not require changes in other site's private numbering plans.
- Easy to troubleshoot
  Even though the dial plan is quite complex in order to accommodate scalability and expendability, the dial plan will ease troubleshooting of dial plan issues nevertheless, if most projects use it as a basis of their implementation and document the deviations from the reference architecture dial plan.

The reference architecture emphasizes scalability and expendability, rather than a simple dial plan design. Some of the mechanisms used here are not known to service personnel and require training. For example, the reference architecture introduces:

- A new longest match comparison scheme in order to reach a better scalability
  This allows the number of entries to rise linearly with the number of sites, as opposed to a quadratic increase in other dial plan schemes accommodating toll restriction, (e.g. the US dial plan scheme will have a quadratic increase of entries, if toll restriction is added).

The usage of a central gateway is pre-provisioned even for cases, when no central gateway is available yet.

## 1.2 WebCDC and Call Routing

The WebCDC has two kinds of sheets:

- Basic sheets
  The Basic sheets depend on the chosen deployment model. When generating the configuration for a deployment model the advanced sheets are filled in the background according to the concept used for the deployment model and afterwards the configuration files are generated.
- Advanced sheets
  The Advanced sheets are used to generate the OpenScape Voice or other aspects of the configuration. Basically these sheets do not contain a deployment model based concept and just generate a configuration file. For the OpenScape Voice routing concept the main advanced sheets filled are:

- Call Routing: dialing rules such as Prefix Access Codes, Destination Codes, Code Indices, etc.
- Endpoints: SIP endpoints similar as defined in the OSV
- Toll And Call Restriction: Toll And Call Restriction definitions similar as defined in the OSV
- Class Of Restriction: Class of Restriction definitions similar as defined in the OSV
- Country Data: Country specific information used for dial plan generation (e.g. mobile number range, special service numbers, etc.)

This document describes the dial plan generated when filling out the WebCDC Basic sheets for the standard deployment model.

***IMPORTANT:*** **Users are strongly recommended to use only the Basic sheets. The Advanced sheets are not as extensively tested as the Basic sheets, and only the most expert WebCDC users should access the Advanced sheets.**

# 2 Routing in the Standard Deployment Model

In the standard deployment model, when filling out the basic sheets, the following assumptions are made:

- In normal situations, subscribers can reach each other via the WAN. This behavior can be overridden in scenarios where OSV integrates in an existing private network, where it is possible to send calls to other PBXes via a site's PBX (i.e. using an existing PBX back-bone network).
- Each site has a single private numbering plan shared by endpoints and subscribers.
- In case of a WAN outage between the OpenScape Voice and the destination subscriber, calls are rerouted (basic subscriber rerouting due to WAN outage) via gateways to the PSTN with no toll restriction.
- In case of a CAC restriction between the calling party and the destination subscriber, calls are rerouted (basic subscriber rerouting due to CAC restriction) via gateways to the PSTN with no toll restriction.
- If a local gateway is down, the call can be rerouted (gateway rerouting) to a backup gateway (optional).
- Emergency numbers are routed without toll restriction to the local gateway. They receive the traffic type Emergency which cannot be toll restricted when dialed directly. If there is no local gateway configured then the emergency call is routed to the central gateway.
- Traffic Types are used for Toll Restriction Service. The following traffic types are created with the standard deployment model:
  - Mobile (used for national mobile numbers if applicable)
  - Premium Rate
  - Directory Assistance

This leads to the following traffic types used in the standard deployment:

- Local (local numbers)
- National (national numbers)
- Mobile (national mobile numbers if applicable)
- International (international numbers)
- Directory Assistance (e.g. 411 in USA)
- Premium Rate (e.g. 1900 numbers)

See section '**Classes of Restriction and Dialing Permissions'** for use of traffic types in classes of restriction and assignments of classes of restrictions to subscribers.

- Gateways are set up to deliver called party numbers prefixed with public network access code (PNAC) and - if appropriate - international or national prefix according to the type of number received from the public network (PSTN).These gateways are also set up to

receive called party numbers in the type of number requested by the PSTN prefixed with PNAC and - if appropriate - international or national prefix.

- The following chapters discuss the buildup of the dialing plan from the information entered in the standard deployment data sheets.

## 2.1 Standard Deployment Sheets

### 2.1.1 Site Data Sheet

A simple standard deployment is shown in Figure 1.


**Note** that more complicated scenarios are supported as well of course.

In a typical customer deployment, a company is identified via a head quarter and has one or more satellite locations. The basic WebCDC tool for a standard deployment supports this concept in the Site data sheet.

The rows in the data sheet that are relevant for the automatic generation of the dial plan for the standard deployment.

- **Site Name:** is used to mark all site-specific resources such as Branch office (BO_<Site Name>), Numbering Plan (NP_<Site Name>), Routing Area (RA_<Site Name>), etc.
- **Access code for outgoing line:** also called the Public Network Access Code (PNAC); is used to indicate the number used by subscribers of a particular site to indicate that an off-net call is being made.
- **Site prefix:** the standard deployment solution automatically supports the concept of dialing site prefixes to reach a particular site from other sites. These site prefixes are used for inter-site dialing

and will also be shown on the display to identify the subscribers. Site prefixes must be unique digit combinations and should not overlap with the access code for outgoing line.E.g. in the example 0 exists as an outgoing line access code – the administrator will not be allowed to create site prefixes that start with 0.The site prefix itself is an optional parameter. If left empty, the default site prefix 123 is used. The WebCDC tool will verify that all extensions within sites with the same Site Prefix are unique.

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***INFO:*** the restriction to not allow creating site prefixes that start with a number used as outgoing line access codes does not exist for NANP sites

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Other important rows in the Site data sheet that influence the auto-generated dialing plan are:

- **Extension ranges:** is used to list – at a minimum – the private extensions and/or extension ranges that may be used for subscribers in a site that have no DID Number assigned. It may also include the public extensions and/or extension ranges that may be used for subscribers in a site that have a DID Number assigned. In any case, the Extension given to subscribers in the Subscriber data sheet must either be listed here or derived from the Subscriber DID Extension Range in the Endpoints data sheet.

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  ***INFO:*** If digits are borrowed from or given to the Subscriber Code/Local Office Code in the Endpoints data sheet, this must be indicated in this Extensions range by entering the ‘real’ extensions range matching the Subscriber DID extensions range as the first extensions range.E.g. if an endpoint has CC: 1; AC:561; LOC: 923 and Subscriber DID extension range: 1000-1999 and the administrator wishes to use extensions 31xxx, then the Extensions range in the Site data sheet must have 31000 – 31999 as first entry because the WebCDC tool matches these entries against each other.

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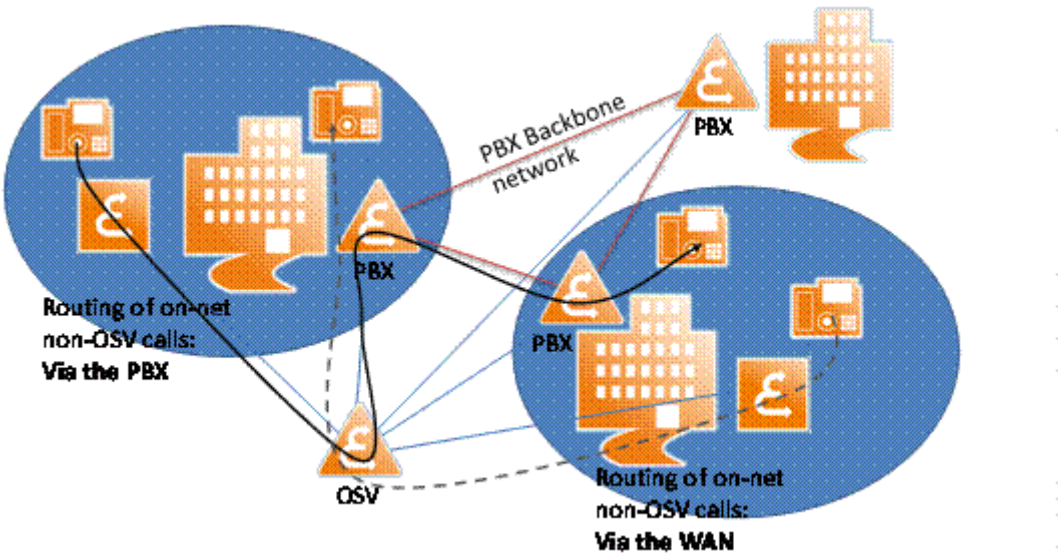
- **Make default subscribers for the extension range:** this is used to create default subscribers for each extension in the Extensions range. Each subscriber receives a default name.
- **Backup Gateway for Local Gateway:** this field contains the Site Name of the site where the gateway is located that will be used in the local numbering plan as a backup in case the local gateway is out of service. This field is used for the standard and customized break-out strategy (see ‘Calling a PSTN Subscriber ‘).
  - If the standard breakout strategy is chosen the first configured gateway (or proxy+gateway) endpoint in the Endpoints data sheet that belongs to the entered Site Name is used as a backup gateway to the local gateway. If multiple backup gateways are required, then the customized breakout strategy should be used.

  - If the customized breakout strategy is chosen this information is used to pre-populate the Breakout Endpoints data sheet when the Fill Break Out matrix with default settings button is pushed.
- **Central Gateway:** this field contains the Site Name of the site where the gateway is located that will be used as central gateway. A central gateway means that all traffic (local, national and international) is sent to the PSTN from this site via the indicated gateway. This field is used for the standard and customized break-out strategy (see sub-sections of 'Calling a PSTN Subscriber'). The same observations as above are valid.
- **Default Dialing Permissions for the Subscribers:** when creating a subscriber for this site, this indicates the default dialing permission that will be pre-populated on the subscriber row.This value can always be modified for the individual subscriber.
- **Xpressions Numbers:** these numbers are used in case an Xpressions Voice Mail server is deployed. An Xpressions server endpoint's IP address must be entered on the IP data sheet.
- **Media Server Conference Number:** this number is set as conference number on the central Media Server(s) listed on the IP data sheet. At least one central media server endpoint's IP address must be entered on the IP data sheet.
- **Auto Attendant Public Number:** this public number is used to call the auto attendant. This functionality is available on the OpenScape Branch line of products and on Xpressions. For a main site, WebCDC tool assumes that the auto-attendant is a number that must lead to the Xpressions endpoint and provides the routing for such. If an auto-attendant number is set for a site which is not the main office, then WebCDC tool will
  - Either use existing translation to call an OSV subscriber, provided the subscriber is entered in the Subscribers data sheet.
  - Or map the number to the main site auto-attendant number (Xpressions server). In this case the auto-attendant is also configured on OpenScape Branch and used in case the OpenScape Branch is in survivable mode.
- **Use Local Toll Tables:** This is a North American Numbering Plan setting to activate the use of local toll tables for the site. This parameter has no effect for sites that are not part of the North American Numbering Plan (i.e. do not use country code 1). This impacts the amount of destination codes that will be generated for a site's numbering plan.
  - If set to No (default setting if left empty), only national numbers are sent to the site's break-out gateway towards the PSTN. Also, the traffic type Local is not used for these sites.
  - If set to Yes, local toll tables will be used to expand the destination codes for the local calling. For sites located in urban areas, this can generate a significant amount of destination codes. This setting allows dialing 7 digit numbers or 10 digit numbers without national prefix 1.

***INFO:*** Regardless of the value of this flag, the Local Toll Tables will be downloaded from the web (if not done already) as the Local Toll Tables will still be used in DNM tables.

- **Routing of On-Net Non-OSV Calls:** This setting applies to scenarios where OSV integrates in an existing private network. To activate this field, the Special Customer Configuration field in the General data sheet must be set to PBX-Routing.
  - When setting this field to Via the PBX, calls to subscribers of other sites that are not OSV subscribers are routed via the local PBX. The local PBX is then expected to route the call to the destination PBX using the existing private network infrastructure that interconnects the customer's PBXes.
  - When setting this field to Via the WAN (default setting if left empty), calls to subscribers of other sites are routed directly via the WAN.A call to a non-OSV subscriber of another site is therefore sent directly to the destination PBX.




- **Is Carrier Code Dialing Supported:** This setting (relocated to the General data sheet) applies only for sites of countries where carrier code dialing is supported (e.g. Brazil).To activate this field, the Is Carrier Dialing Supported field in the General data sheet must be set to Yes.
  - When setting this field to Yes, the user needs to dial a carrier code to dial out to the PSTN. This carrier code is not remembered and will not be used on the outbound route. This should be used when users are frequently making mistakes when they have to dial carrier codes at home and then not have to dial them when at work.

– When setting this field to No (default setting if left empty), the user does not need to dial a carrier code to dial out to the PSTN.

In any case the dialed carrier code is ignored and replaced with the presubscribed long distance carrier code entered on the Endpoints data sheet, between the international or national prefix and the international or national number from the Endpoints data sheet.

***INFO:*** The Site Prefix and Extension out of the Extensions range together form a private number. The site prefix will thus form the private office code.

## 2.1.2 Endpoints Data Sheet

From a dialing plan perspective, the Endpoint data sheet allows entering the information regarding the PSTN gateways in use by the customer.

Especially important are the following fields:

- **Endpoint Name (Gateway or Proxy Name):** name given to the endpoint. This name will be used as endpoint name for the SIP endpoint created on OpenScape Voice.
- **Site Name:** name of the site in which the endpoint is located. Per definition, any gateway created this way is a local gateway for the site.
- Endpoint Signaling Type: the endpoint is considered to be a PBX when this is set to SIP-Q.
- **Endpoint Usage:** for the automatic dial plan generation, the values Gateway and Proxy and Gateway are important.
- **Country Code:** country code of the DID numbers served by this gateway. This is a mandatory field.
- **Area Code:** area code of the DID numbers served by this gateway. This is an optional field. However, one of Area Code or Subscriber Code/Local Exchange Code below must be configured.
- **Subscriber Code/Local Exchange Code:** local office code of the DID numbers served by this gateway. This is an optional field. However, one of Subscriber Code/Local Exchange Code or Area Code above must be configured.
- **Subscriber DID Extension Range:** Extensions and/or Extensions ranges that together with country, area and local exchange code form the DID numbers ‘purchased’ from the carrier for this gateway.
- **Default Home DN:** this field must be filled out for SIP Gateways and must contain a public number assigned to the gateway (the WebCDC tool requires this to be a configured subscriber).
- **Presubscribed Carrier Code:** for carrier code dialing scenarios, this code is placed between the national prefix and the national

number or between the international prefix and the international number. To activate this field, the Is Carrier Dialing Supported field in the General data sheet must be set to Yes.

Each gateway is used for incoming and outgoing traffic. The numbers that the carrier has configured to be delivered via the gateway are recorded in the Country Code, Area Code, Subscriber Code/Local Exchange Code and Subscriber DID Extension range. It is **very important** to get an accurate description for the numbers delivered to the OSV by the carrier in order to prevent forming loops where both OSV and carrier think that a number is owned by the other.These DID numbers will end up as Home DN ranges on the OSV.

It is allowed to configure more than one Gateway endpoint per site. Redundant gateways would be configured by assigning the same DID range as a previously defined gateway. Otherwise (non-redundant gateway),the DID numbers assigned to the Gateway Endpoints need to be unique.This allows specifying a PBX and a PSTN Gateway for the same site. Numbers of non-OSV subscribers that belong to the customers' private network will be routed to the PBX, while external numbers will be routed to the PSTN gateway as well as the PBX.

The numbers assigned to PBXes (SIP-Q signaling type) will be entered as Home DNs only when they are assigned to an OSV subscriber entered on the Subscribers data sheet.

## 2.1.3 Subscribers Data Sheet

So far, in the background with the information from the 2 previous data sheets a whole series of numbers has been created:

- From the Site data sheet; the private extensions that can be used within the site are listed.
- From the Site data sheet; the private numbers that are valid within the business group can be constructed by combining Site Prefix with each extension in the Extension ranges.
- From the Endpoint data sheet; the public numbers that are owned by the OSV can be constructed by combining Country Code, Area Code, Subscriber Code/Local Exchange Code and each of the numbers in the Subscriber DID Extension Range.
- From the Endpoint data sheet; the public numbers that are owned by the PBXes can be constructed by combining Country Code, Area Code, Subscriber Code/Local Exchange Code and each of the numbers in the Subscriber DID Extension Range.

The Subscriber data sheet then allows assigning these numbers to subscribers.

Especially important are the fields:

- **Subscriber Name:** name given to the subscriber. This name will be used as name for the SIP Subscriber created on OpenScape Voice.

- **Site Name:** site to which the subscriber belongs. The site name will limit the numbers that can be entered in the Direct Inward Dialing Number field.
- **Subscriber Dialing Permissions:** the permission (one of international, national, mobile, local, office) that will determine the class of restriction to be used within the Toll and Call Restriction service. If left empty, the Default Dialing Permissions for Subscribers of the Site data sheet apply. If that value is empty as well, then Toll and Call Restriction Service is not activated for the subscriber.
- **Direct Inward Dialing Number:** a public number assigned to the subscriber and used as Subscriber Directory Number.
  - If left empty and the Extension is in the range of the Endpoint data sheet, than the subscriber receives a public number from the Endpoint sheet. The subscriber has a public Home DN.
  - If filled out, the number is uniquely bound to the subscriber and can therefore not be reused for other subscribers. The subscriber has a public Home DN.
  - Otherwise, the subscriber receives a private number based on Site Prefix and Extension. The subscriber has a private Home DN.
- **Extension:** Only private extensions from the Site data sheet Extensions range or Subscriber DID Extensions from the Endpoints data sheet for the given ‘Site Name’ should be entered here. Although it is possible to enter an extension that has been listed neither in Endpoints data sheet nor in Site data sheet.If that’s the case, the extension is automatically considered a private extension. The extension field must be filled out (mandatory) and the number is uniquely bound to the subscriber within the site mentioned under ‘Site Name’ and cannot be reused for other subscribers within that site. This number will become the Display Extension in the OSV subscriber object. No attempts are made at making this number dial-able if a Direct Inward Dialing Number is provided. In the latter case only the extension defined for the Direct Inward Dialing Number is dial-able.

### 2.1.4 Breakout

The WebCDC tool supports two breakout strategies for routing to the PSTN. The breakout strategy is selected in the General data sheet from the Breakout Strategy field. There the administrator can select:

- Standard.
- Customized.

### 2.1.4.1 Standard Breakout Strategy

Under this breakout strategy, the site names specified in the Site sheet for Central Gateway and Backup Gateway for Local Gateway are used for making calls to the PSTN. For each site, this strategy consists of sending calls to the PSTN to the following prioritized list of gateways:

Gateway endpoints specified for the Site Name entered in the Central Gateway field.

- Gateway endpoints specified for the own Site Name.
- Gateway endpoints specified for the Site Name entered in the Backup Gateway for Local Gateway field.

All destinations and routes are provisioned in the site's local numbering plan, which eliminates the need for using code indexes in the common numbering plan.

There are some restrictions when using the Standard Breakout Strategy:

- Only the Gateways which are in the same country as the local Gateway can be specified as Backup Gateway for the Local Gateway or as Central Gateway. That means there's no possibility for an international breakout.
- Deployment of a Central Gateway and/or Backup Gateway for Local Gateway is not supported for sites using the North American Numbering Plan (country code 1). If there are North American sites which make use of a central or backup gateway, then customized breakout strategy must be selected

### 2.1.4.2 Customized Breakout Strategy

Regardless of the chosen breakout strategy, the WebCDC tool will as a basic rule always provide access to the PSTN via the locally defined gateways. No additional information needs to be entered in the Breakout Endpoints data sheet in order to get this functionality.

Additionally to this default use of local gateways, the administrator can choose to:

- Configure the site name for a backup gateway for the local gateway on the Site data sheet. Backup gateways can be any gateway located in another site (usually the gateway of a neighboring site).
- Configure the site name for a central gateway on the Site data sheet (central hop-off).
- Configure breakout gateways. Breakout gateways allow subscribers of sites to use other sites' gateways to make calls to the public network (this feature is also known as tail-end hop-off).This configuration option allows maximal use of the private network owned by the customer to reduce costs for dialing into the public network.

This configuration occurs in the Breakout Endpoints data sheet.

The fields are explained below:

- **Site Name:** name of the site for which a local or a backup gateway is specified or which can be used for local, national or international break-out by other sites or countries.
- **Breakout Gateway:** name of the local gateway that may be used for break-out to the PSTN by other sites. Note that once a breakout gateway is defined in a site, the users of that site that are allowed to use a breakout gateway for PSTN access are automatically using that breakout gateway for PSTN access unless another site can provide better (i.e. more cost-efficient) access. The Breakout Endpoint entries are auto-generated from the gateway endpoints in the Endpoints data sheet if left empty at the time of generation.
- **Enter Site Name that will use the Breakout Gateway for Local Traffic:** sites entered here are allowed to use the site's breakout gateway to make local calls from the perspective of this site.From the dialing user's perspective the call will of course retain the characteristics determined by the dialing user's site .As an example, a subscriber in the Hamburg site could be allowed to use EP_Munich to make a local call to a retail store in Munich. To dial the retail store, the Hamburg user must dial a national number, however, the call will leave the private network through EP_Munich as a local call.
- **Enter Site Name that will use the Breakout Gateway for National Traffic:** sites entered here are allowed to use the site's breakout gateway to make national calls from the perspective of this site.From the dialing user's perspective the call will of course retain the characteristics determined by the dialing user's site.
- **Enter Site Name Code that will use the Breakout Gateway for International Traffic:** sites entered here are allowed to use the site's breakout gateway to make international calls from the perspective of this site. From the dialing user's perspective the call will of course retain the characteristics determined by the dialing user's site.

## 2.1.5 Routing of On-Net Calls

Another factor affecting the routing of calls to on-net destinations is configured via the Special Customer Configuration that can be selected in the General data sheet. If this is set to PBX-Routing, then the Routing of On-Net Non-OSV Calls option appears on the Site data sheet that allows specifying how on-net non-OSV calls are routed:

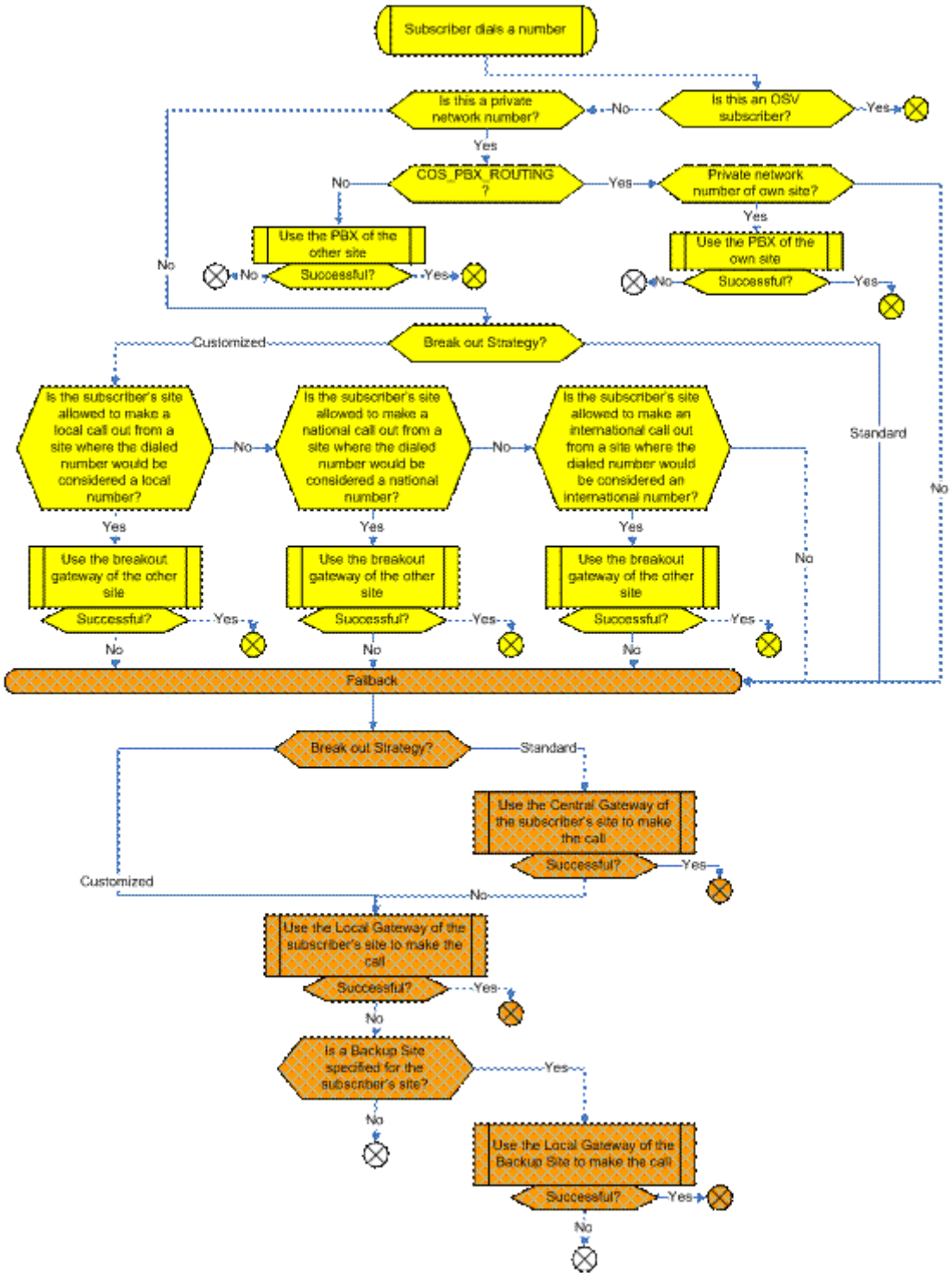
- When setting this field to Via the PBX, calls to subscribers of other sites that are not OSV subscribers are routed via the local PBX. The local PBX is then expected to route the call to the destination PBX using the existing private network infrastructure that interconnects the customer's PBXes. The routing decision is made by translation via a COS that is assigned to all subscribers created for the site (COS_PBX_ROUTING).Once the parallel private network has been removed, the routing can be modified by the administrator to

routing Via the WAN by simply removing the COS_PBX_ROUTING class of service from the subscribers.

- When setting this field to Via the WAN (default setting if left empty), calls to subscribers of other sites are routed directly via the WAN.A call to a non-OSV subscriber of another site is therefore sent directly to the destination PBX.

## 2.1.6 Endpoint Usage

Based on a subscriber's configuration (Site Name and Class of Service), gateways for accessing the PSTN or the private network are hunted as described in the following Figure:




In the above figure, the yellow path denotes the actions done within the common numbering plan and the brown diagonally squared path is followed in case of fallback.

## 2.2 OSV Objects

The following dial plan related OSV objects are created directly from the information obtained in the standard deployment data sheets:

- Office Codes
- Routing Areas
- Classes of Service
- Home Directory Numbers
- Business Group
- Numbering Plans
- Subscribers
- Endpoints

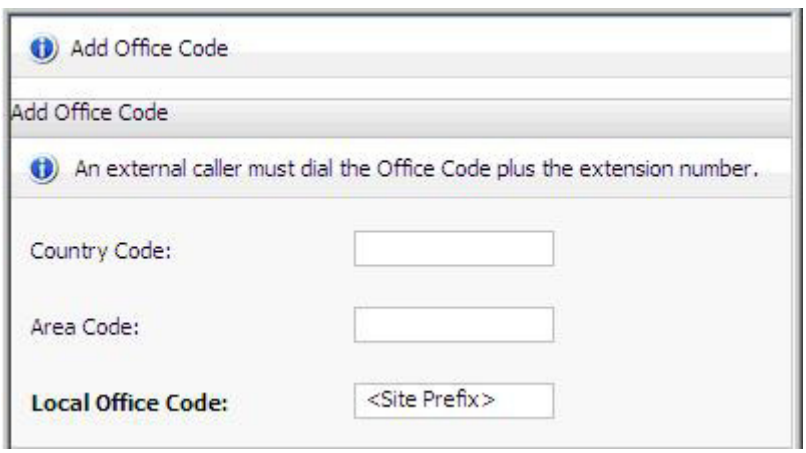
The following dial plan related OSV objects are available per default on the standard deployment data sheets. To extend these, the administrator needs to activate the corresponding advanced data sheets:

- Traffic Types
- Classes of Restriction

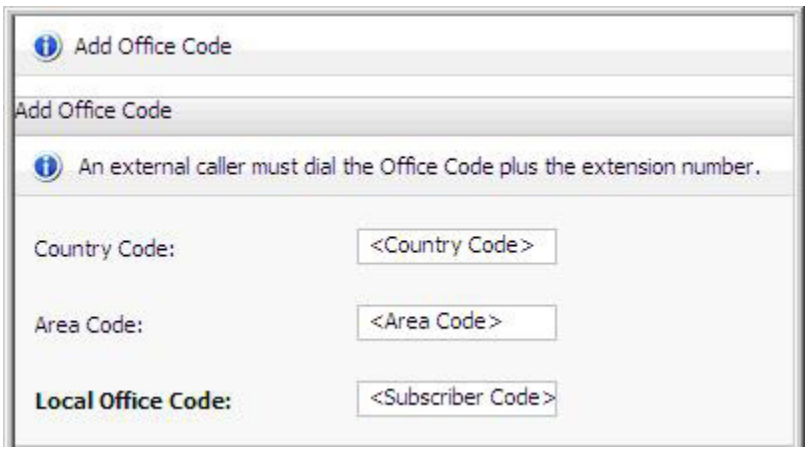
### 2.2.1 Office Codes

Private and Public Office codes are created.

The private office codes are based on the ‘Site Prefix’ information entered in the Site data sheet. Each Site Prefix generates the following office code:



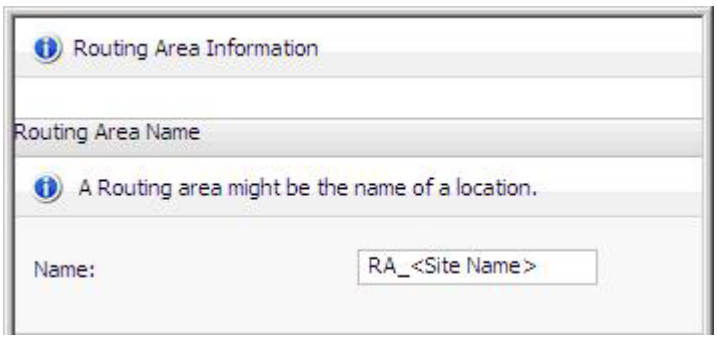

The public office codes are based on the ‘Country Code’, ‘Area Code’ and ‘Subscriber Code/Local Exchange Code’ information collected in the Endpoints data sheet. Each row leads to the following office code:




These office codes are created for SIP and SIP-Q endpoints.

## 2.2.2 Routing Areas

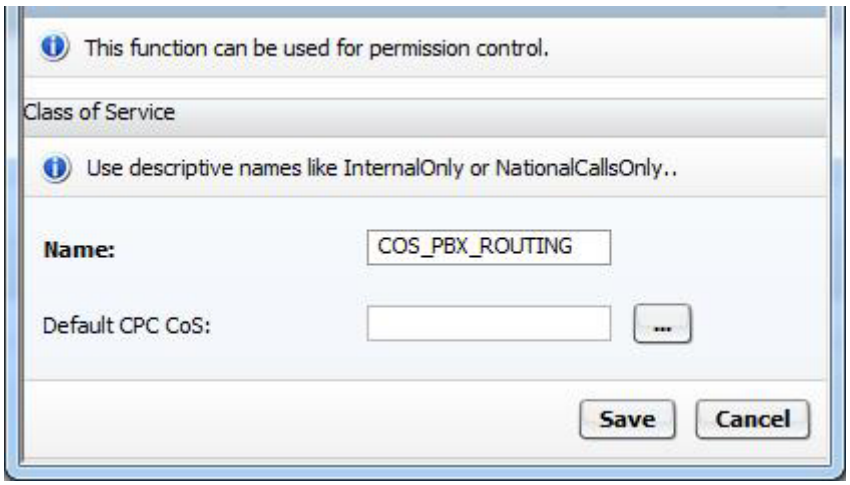
Routing areas are created from the ‘Site Name’ information entered in the Site data sheet. Each site receives the following routing area:




The routing area will be used as location identifier for a site. Every subscriber and endpoint of the site will receive the site’s routing area.

## 2.2.3 Classes of Service

A Class of Service called COS_PBX_ROUTING exists to support routing on-net non-OSV calls via the local PBX. By default the class of service is not assigned to a subscriber. Starting in V7 WebCDC, the class of service may be assigned to a subscriber in PBX migration scenario. For more detail on this, see the "PBX Migration Scenario" section of this document.




## 2.2.4 Traffic Types

The WebCDC tool generates the following traffic types:

- Local
- Mobile
- National
- International
- Premium Rate (e.g. 1900 numbers in USA)
- Toll Free (e.g. 1800 numbers in USA)
- Directory Assistance (e.g. 411 in USA)

**Note** that the traffic type Emergency is pre-defined on OSV.

## 2.2.5 Classes of Restriction

For the Toll and Call Restriction service, classes of restriction are then defined as follows:

| **Class Of Restriction** | **Traffic Type** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Premium Rate** | **International** | **Mobile** | **National** | **Directory Assistance** | **Local** | **Toll Free** | **Emergency** |
| **COR_PremiumRate** | - | - | - | - | - | - | - | - |
| **COR_International** | X | - | - | - | - | - | - | - |
| **COR_Mobile** | X | X | - | - | - | - | - | - |
| **COR_National** | X | X | X | - | - | - | - | - |
| **COR_Local** | X | X | X | X | X | - | - | - |
| **COR_Office** | X | X | X | X | X | X | - | - |

The above table means that subscribers that have COR_PremiumRate assigned are not restricted to dial anything because no traffic types are listed in this class of restriction.

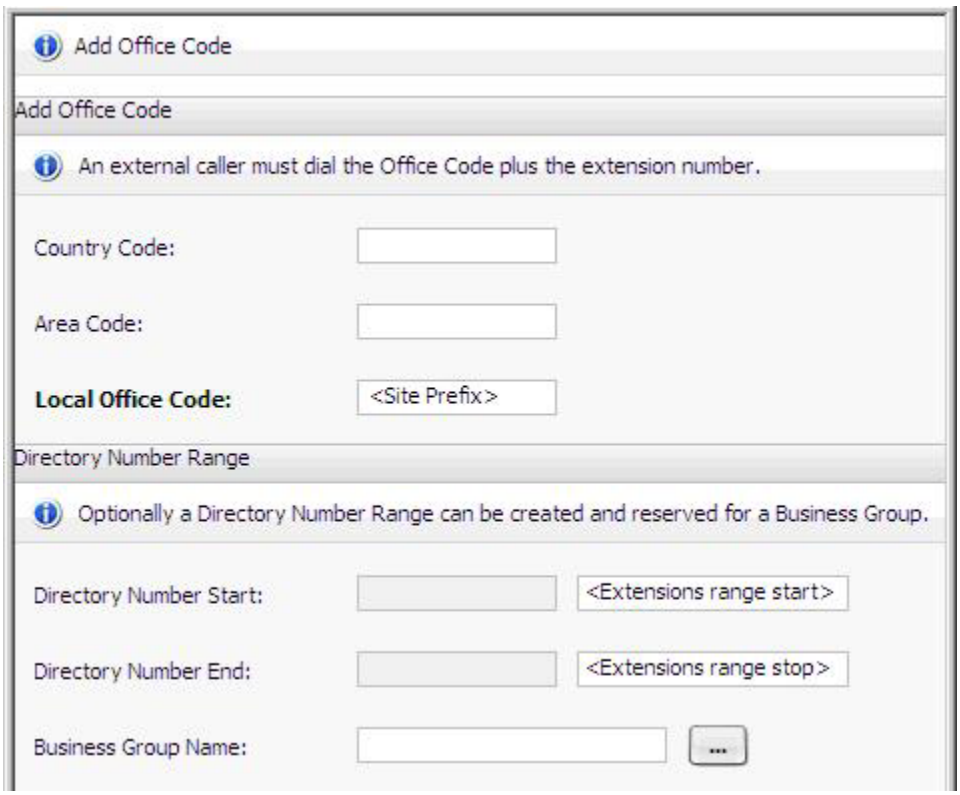
## 2.2.6 Home Directory Numbers

For each office code the numbers and/or number ranges assigned by the public network to OSV need to be listed. This is in order to prevent loops in the network where the public network and OSV each believe that a number is assigned to the other.

Home Directory Numbers can then later be assigned by an administrator to a Subscriber thus forming Subscriber Directory Numbers.

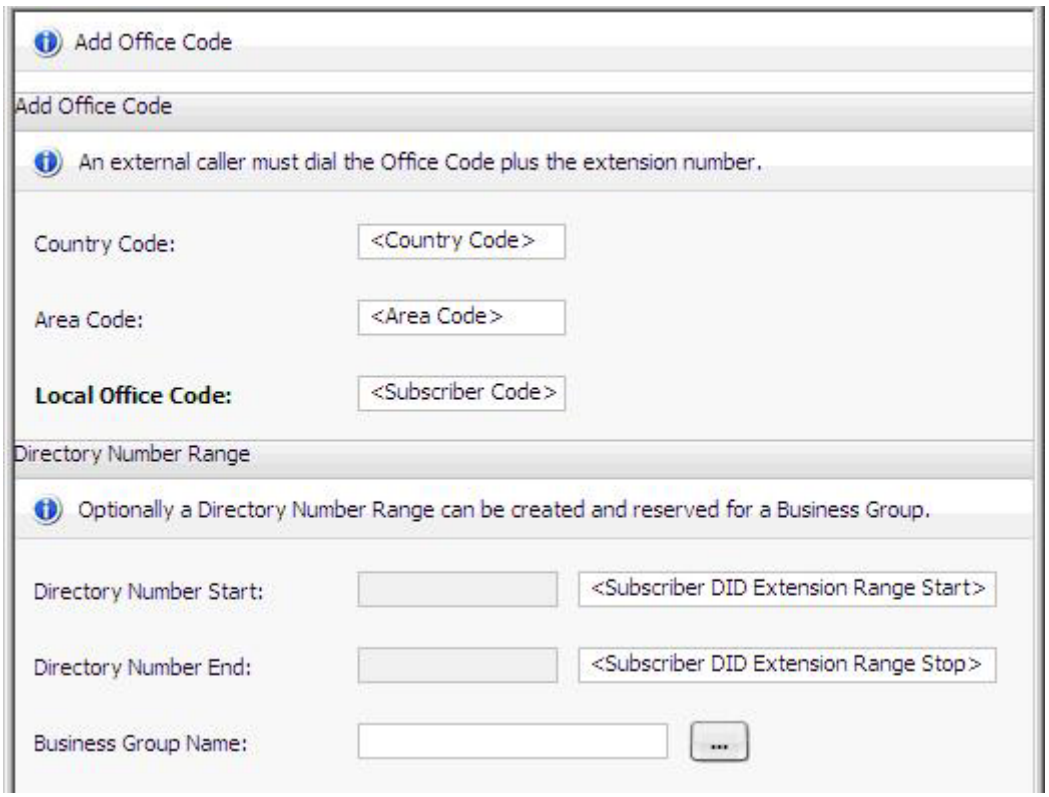
Home Directory Numbers are created for private and public numbers.

The private Home Directory Numbers are based on the ‘Site Prefix’ and the ‘Extensions range’ defined in the Site data sheet. For each Extension range or extension listed which does not relate to a public number from the Endpoints data sheet, a Home DN range is created:




For SIP Endpoints, public Home DNs are based on the ‘Country Code’, ‘Area Code’, ‘Subscriber Code/Local Exchange Codes’ and ‘Subscriber

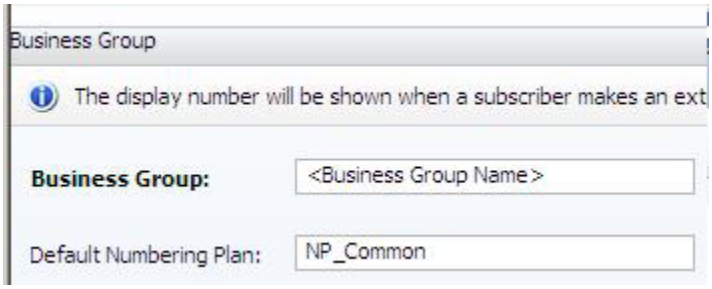
DID Extension Range' defined in the Endpoints data sheet. This leads to the following Home DN ranges:




For SIP-Q Endpoints, the WebCDC tool assumes that PSTN access is provided via the SIP-Q endpoint.As such these SIP-Q endpoints 'own' the number ranges and therefore no Home DN ranges are created for SIP-Q endpoints. The Home DNs are then only created if a Direct Inward Dialing Number of a SIP-Q Endpoint's DID number range is assigned to an OSV subscriber in the Subscribers data sheet.

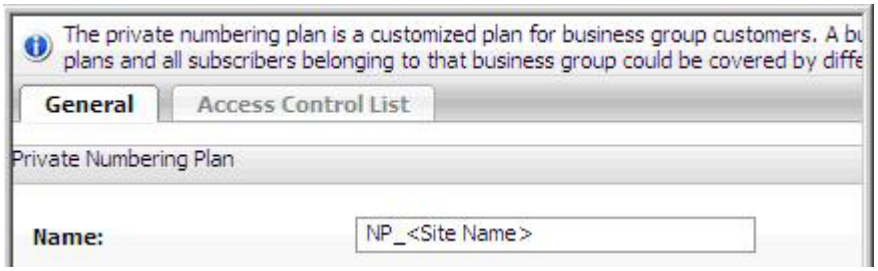
## 2.2.7 Business Group

A single business group is created with the name entered in the 'Business Group Name' field in the General data sheet. This business group gets a numbering plan with name NP_Common that is used as the business group's default and common numbering plan:




## 2.2.8 Numbering Plans

For each site a local private numbering plan is created using the ‘Site Name’ information entered in the Site data sheet. Each site receives the following private numbering plan under the above created business group:

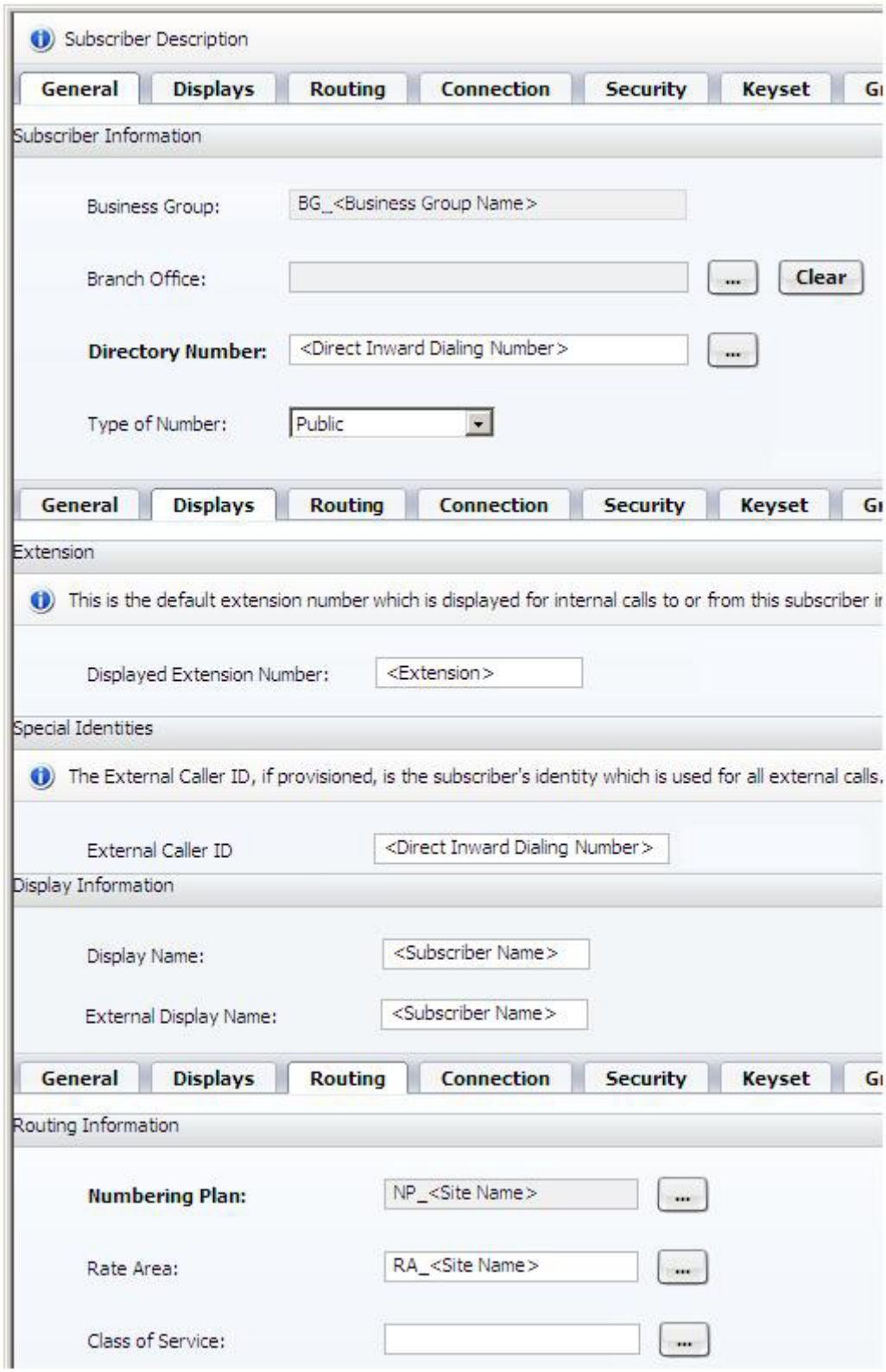



The private numbering plan will be used by all subscribers and endpoints assigned to the site.

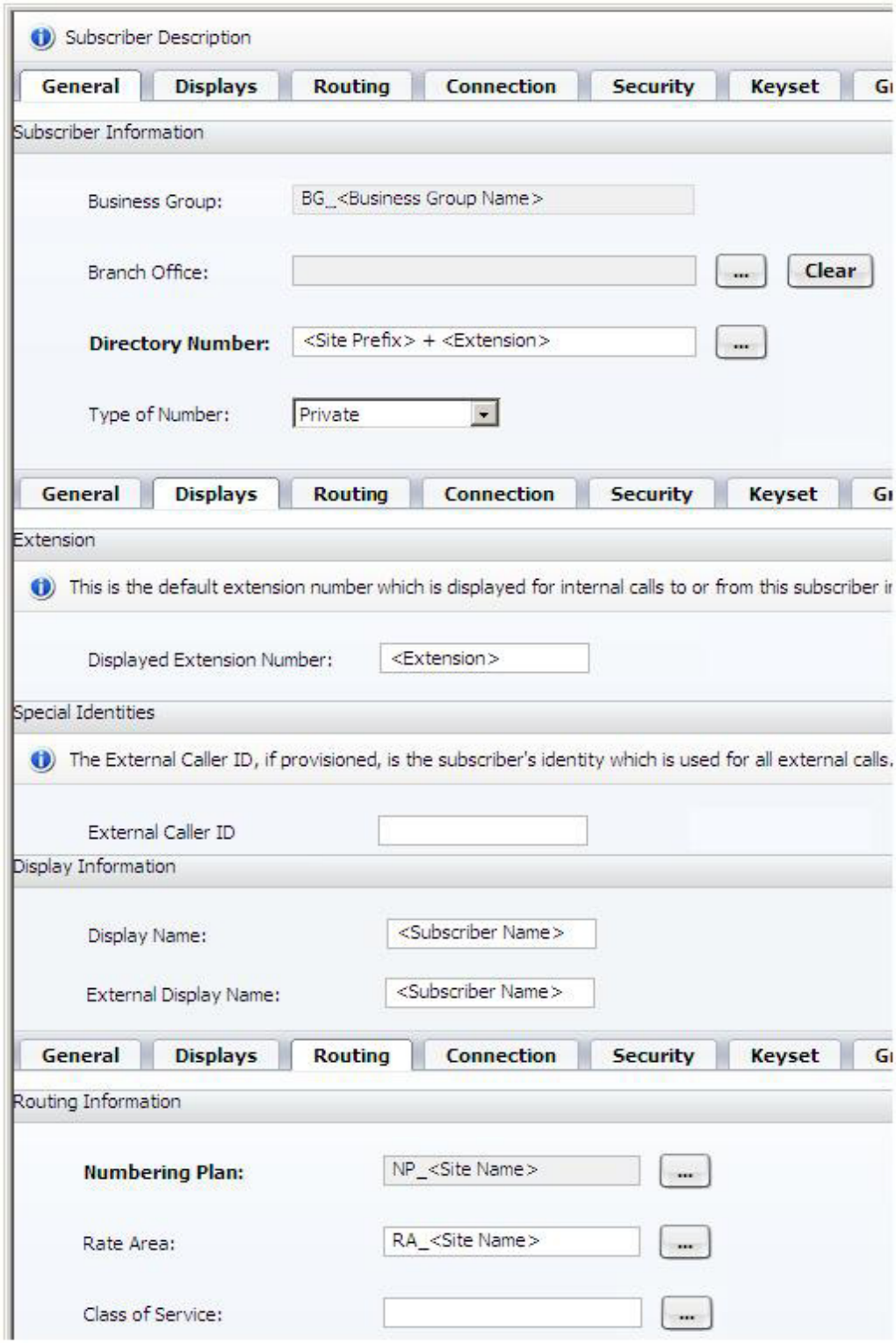
## 2.2.9 Subscribers

All subscribers of the same site receive the same numbering plan NP_<Site Name> and the same routing area RA_<Site Name>. Subscribers are created using information from the Subscribers data sheet:

- If a ‘Direct Inward Dialing Number’ was explicitly entered or an extension was entered that is part of a DID number (implicitly calculated and used by the WebCDC tool), a subscriber is created as follows (only the dialing plan relevant information is shown):


Subscriber Description
General
Displays
Routing
Connection
Security
Keyset
Subscriber Information
Business Group:
BG_<Business Group Name>
Branch Office:
...
Clear
Directory Number:
<Direct Inward Dialing Number>
Type of Number:
Public
Extension
This is the default extension number which is displayed for internal calls to or from this subscriber
Displayed Extension Number:
<Extension>
Special Identities
The External Caller ID, if provisioned, is the subscriber's identity which is used for all external calls.
External Caller ID
<Direct Inward Dialing Number>
Display Information
Display Name:
<Subscriber Name>
External Display Name:
<Subscriber Name>
Routing Information
Numbering Plan:
NP_<Site Name>
Rate Area:
RA_<Site Name>
Class of Service:

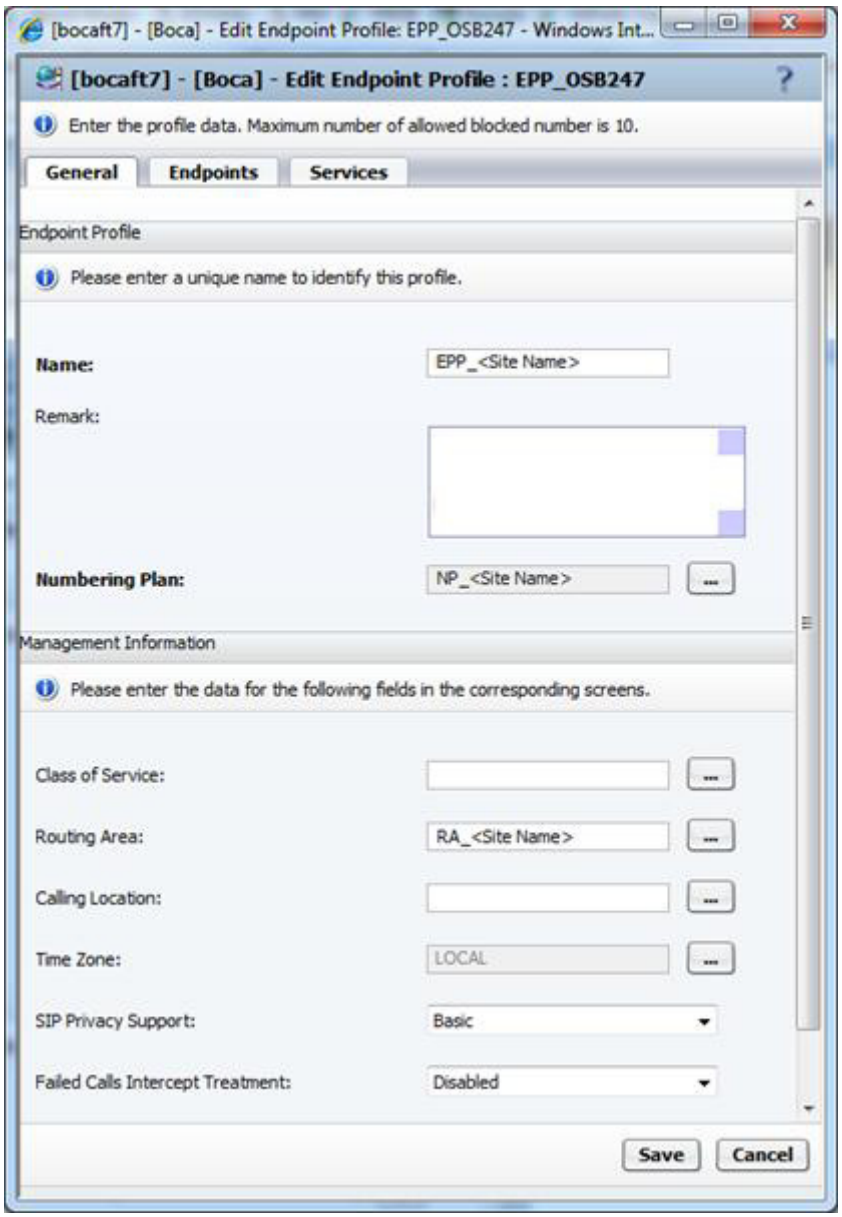
If a ‘Direct Inward Dialing Number’ was not entered, a subscriber is created as follows (only the dialing plan relevant information is shown):



## 2.2.10 Endpoints

Endpoint profiles are created using information from the Endpoints data sheet and the Site data sheet:

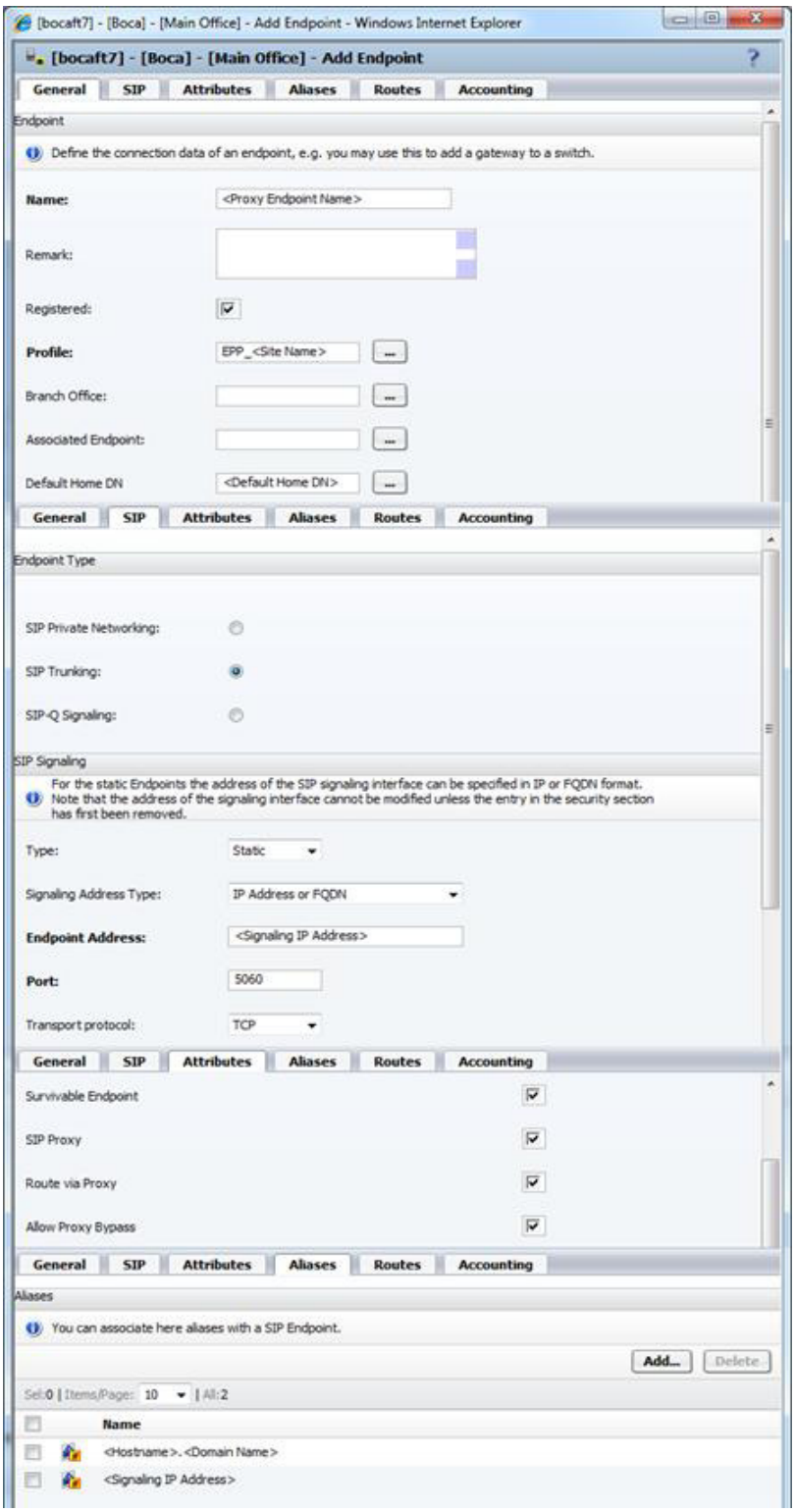
All endpoint profiles of the same site receive the site's numbering plan NP_<Site Name> and the routing area RA_<Site Name>.With the basic privacy Endpoint Profile used for SIP gateways defined per site as follows:



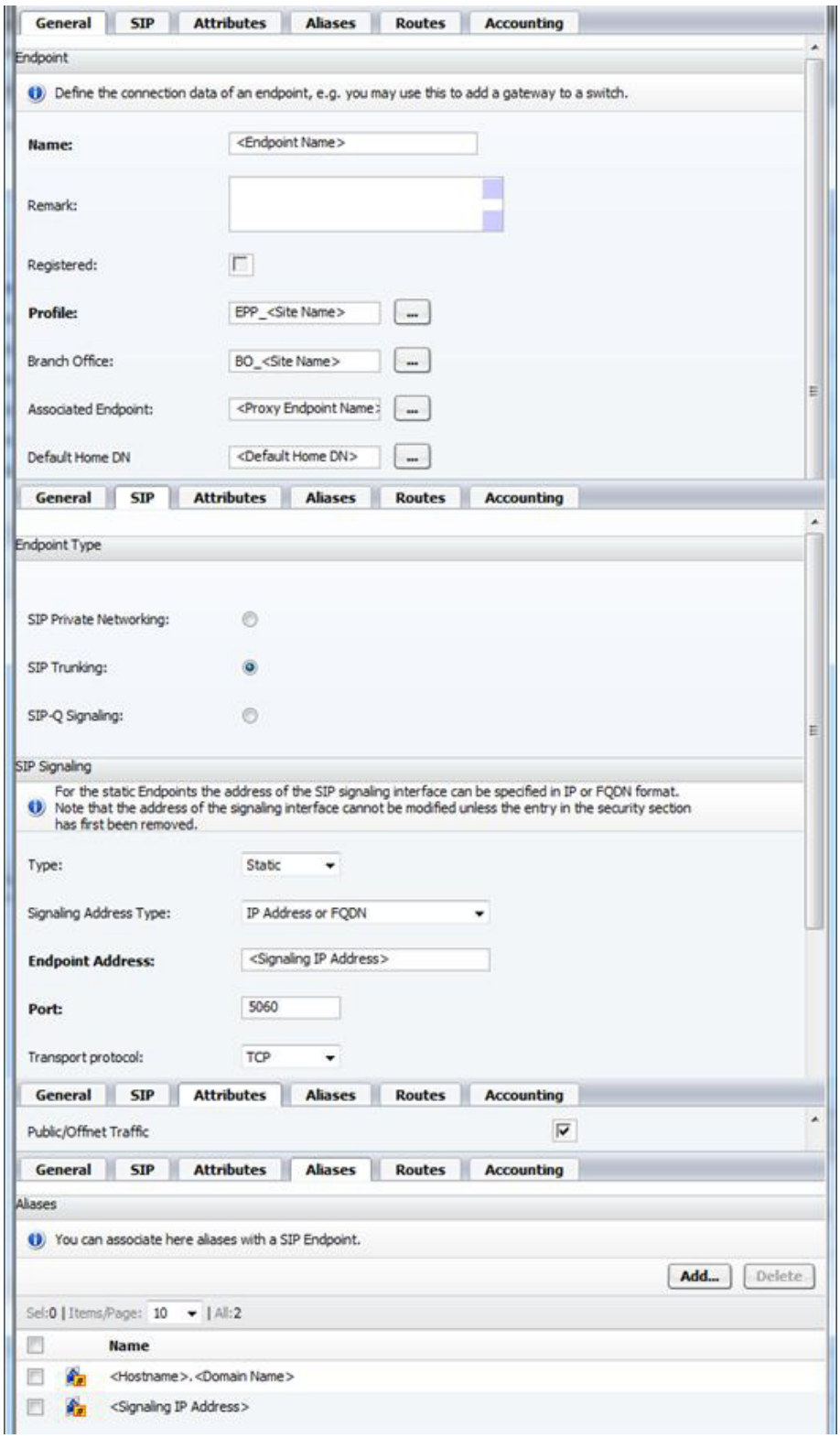

Note:

- For SIP-Q endpoints (hipath4000, hipath3000), a similar endpoint profile with name EPP_FPRVC_<Site Name> is created, where SIP Privacy Support is set to Full Privacy.
- For Xpressions, an endpoint profile with name EPP_Xpressions is created in the numbering plan of the head quarter site. The SIP Privacy support is set to Full Privacy.
- For Media Server, an endpoint profile with name EPP_MediaSrv is created in the numbering plan of the head quarter site.The SIP Privacy support is set to Full Privacy.
- For the Fallback endpoint, a dummy endpoint profile with name EPP_Fallback is created in the common numbering plan (NP_Common).As no calls are ever sent to or received from this endpoint, its settings are actually irrelevant.

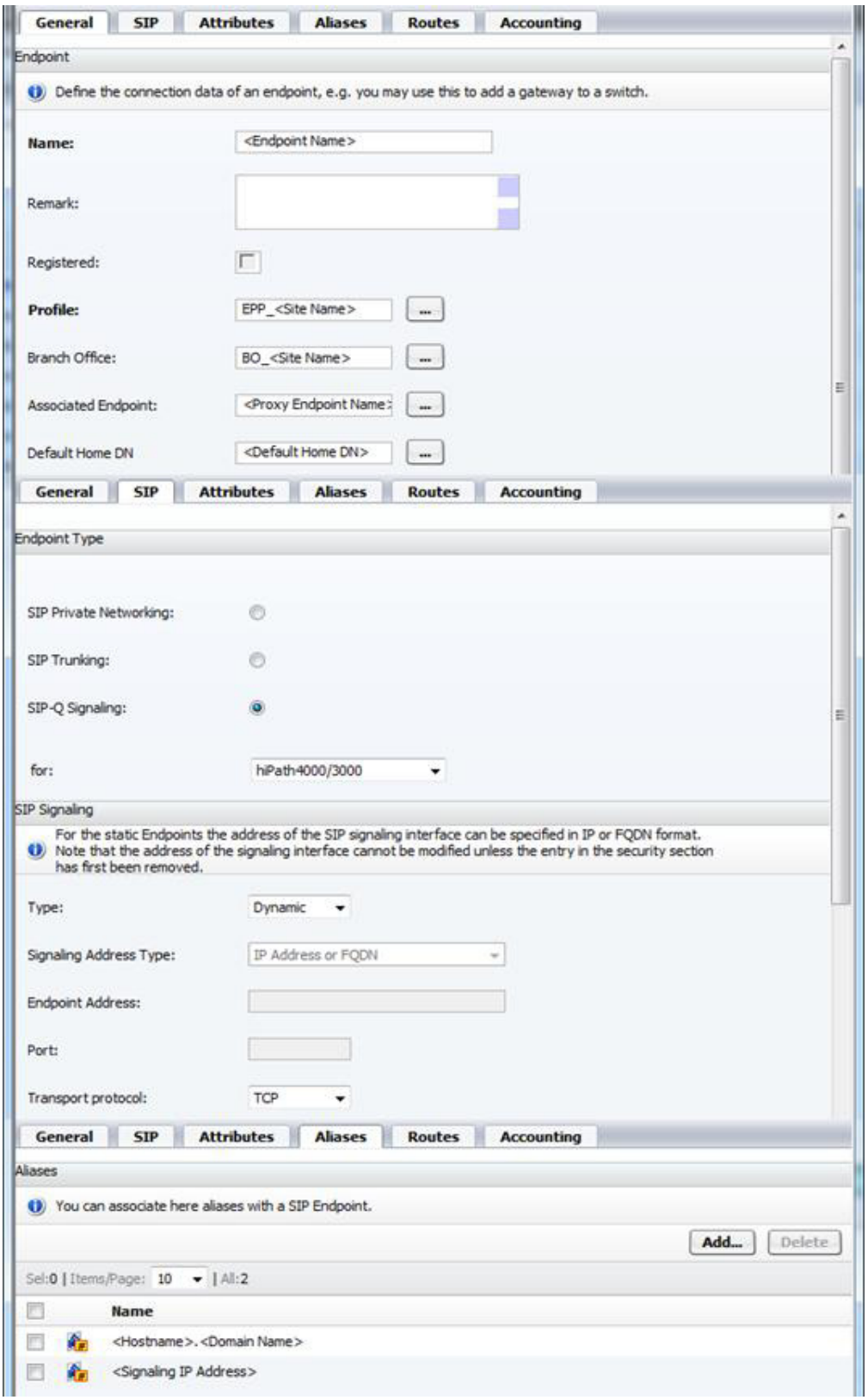
- For SIP proxies:




- For SIP Gateways:




- For SIP-Q Gateways:


General
SIP
Attributes
Aliases
Routes
Accounting
Endpoint
Define the connection data of an endpoint, e.g. you may use this to add a gateway to a switch.
Name:
<Endpoint Name>
Remark:
Registered:
Profile:
EPP_<Site Name>
Branch Office:
BO_<Site Name>
Associated Endpoint:
<Proxy Endpoint Name>
Default Home DN
<Default Home DN>
Endpoint Type
SIP Private Networking:
SIP Trunking:
SIP-Q Signaling:
for:
hiPath4000/3000
SIP Signaling
For the static Endpoints the address of the SIP signaling interface can be specified in IP or FQDN format.
Note that the address of the signaling interface cannot be modified unless the entry in the security section has first been removed.
Type:
Dynamic
Signaling Address Type:
IP Address or FQDN
Endpoint Address:
Port:
Transport protocol:
TCP
Aliases
You can associate here aliases with a SIP Endpoint.
Add...
Delete
Sel:0 | Items/Page: 10 | All:2
Name
<Hostname>.<Domain Name>
<Signaling IP Address>

The following special endpoints are created as well:

- **EP_MediaSrv1** with endpoint profile EPP_MediaSrv and attributes “Send International Numbers in GNF” and “Allow Sending Insecure Referred-By Header” and a single alias with the IP address of the Media Server.
- **EP_Xpressions** with endpoint profile EPP_Xpressions and attribute “Voice Mail” and a single alias with the IP address of the Voice Mail Server.
- **DummyEP_HQ** with endpoint profile EPP_<Site Name of Headquarters> and attribute “Survivable” without any aliases.
- **Fallback** with endpoint profile EPP_Fallback without attributes or aliases.

## 2.3 Automatic Dial Plan Creation

It is important to know which dial plan rules are created as a consequence of the settings in the WebCDC tool’s basic configuration sheets for the standard deployment model.

The dial plan generated for the standard deployment model – like any other dial plan – supports the following situations:

- Dialing the number of an OSV subscriber (extension dialing, site prefix dialing, etc.)
- Dialing the number of an on-net subscriber (site prefix dialing, etc.)
- Dialing an off-net public number (local, national, international with or without breakout).
- Subscriber Rerouting (Basic/Enhanced)
- Dialing Service Access Codes.

The above mentioned dialing use cases are handled in detail in the next sections.

A dialed number by a subscriber or an incoming called party number from a gateway or other SIP endpoint is initially handled by the numbering plan assigned to the subscriber or endpoint. As all subscribers or endpoints are members of a site (the head quarter site is a site as well) and all subscribers and endpoints within a site use the same numbering plan with name NP_<Site Name>, the dialed digits or the called party number are offered to this numbering plan.

Numbers for which the type of number is unknown (implicit numbers) are offered to the numbering plan’s Prefix Access Codes table, while numbers for which the type of number is known (explicit numbers) are offered to the numbering plan’s Destination Codes table. **Only SIP-Q endpoints** can send called party numbers for which the type of number is known.

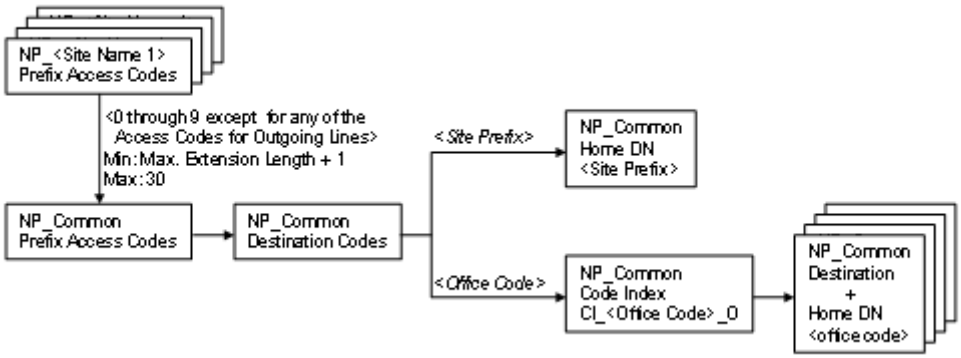
## 2.3.1 Calling an OSV Subscriber

With the standard deployment dialing plan, an OSV subscriber can be reached using:

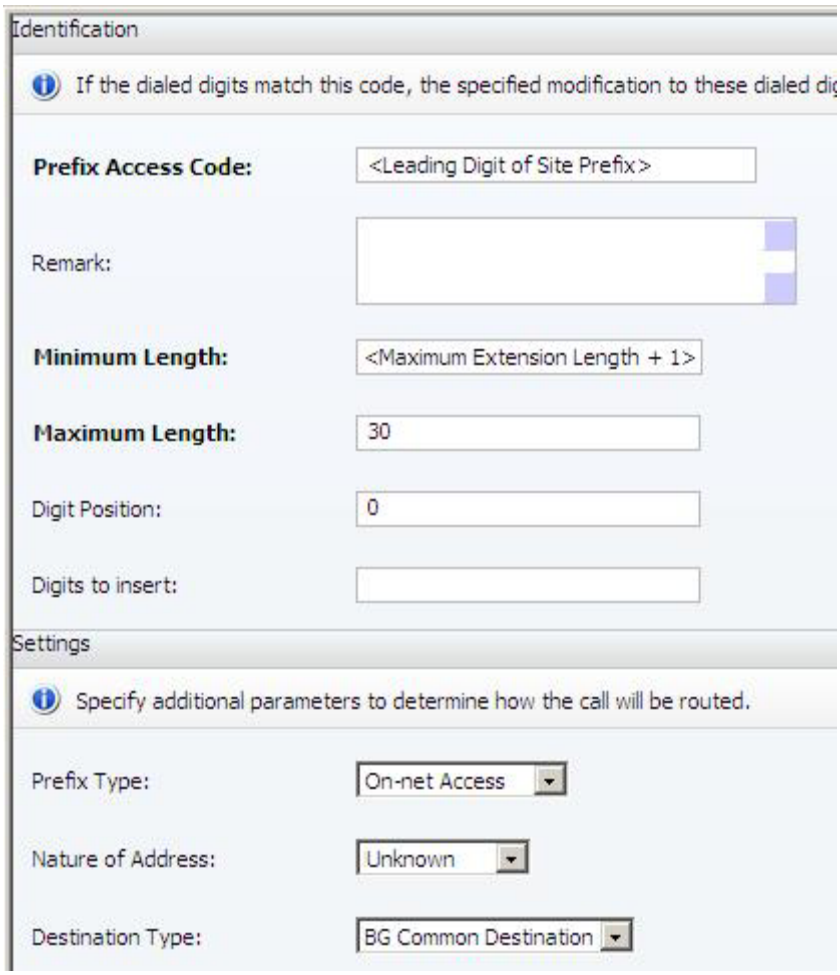
- Extension dialing within the site.
- Site Prefix dialing between sites.
- Public number dialing if the OSV subscriber has a Direct Inward Dialing Number – this way of dialing is mainly used by the gateways, but can also be used by the OSV subscribers.
- DSS key dialing.DSS keys always contain an OSV subscriber's Directory Number.

### 2.3.1.1 Extension Dialing

Each site's numbering plan is set up to allow extension dialing between the subscribers (and possibly PBX'es) of the switch.




Extensions are prefixed with the Site Prefix from the Site data sheet and then sent to the NP_Common numbering plan for further treatment. For the standard deployment the length of the extensions in use for a site are determined (see Calling an OSV Subscriber - Special Cases – Borrowing Digits from the Public Office Code for the Extensions'). For each possible leading digit (0 through 9), an entry is added in the NP_<Site Name> numbering plan with the following contents:



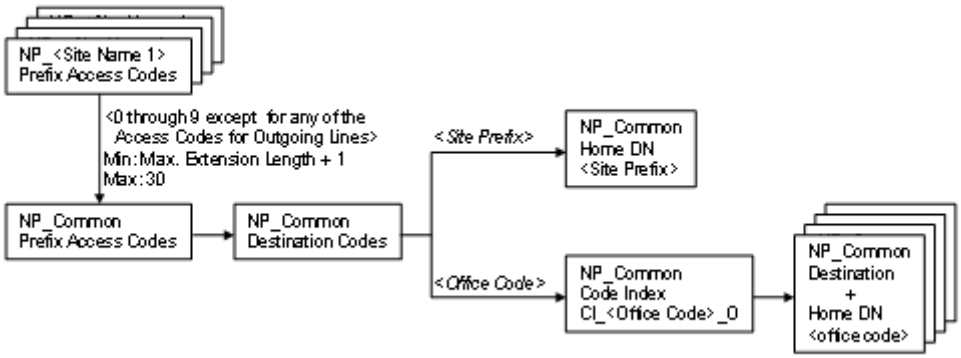

A dialed extension, matching this PAC entry will result in a site prefix dialed number being presented to the common numbering plan NP_Common.See Handling OSV Subscriber Numbers in the Common Numbering Plan for what happens further to these numbers.

In the event no Site Prefix was entered in the Site data sheet, the standard deployment dialing plan assumes that a closed extension dialing plan is deployed for this customer.In that case, the default Site Prefix 123 is used.At this point, the WebCDC tool internally does **not** support creating sites without site prefix.

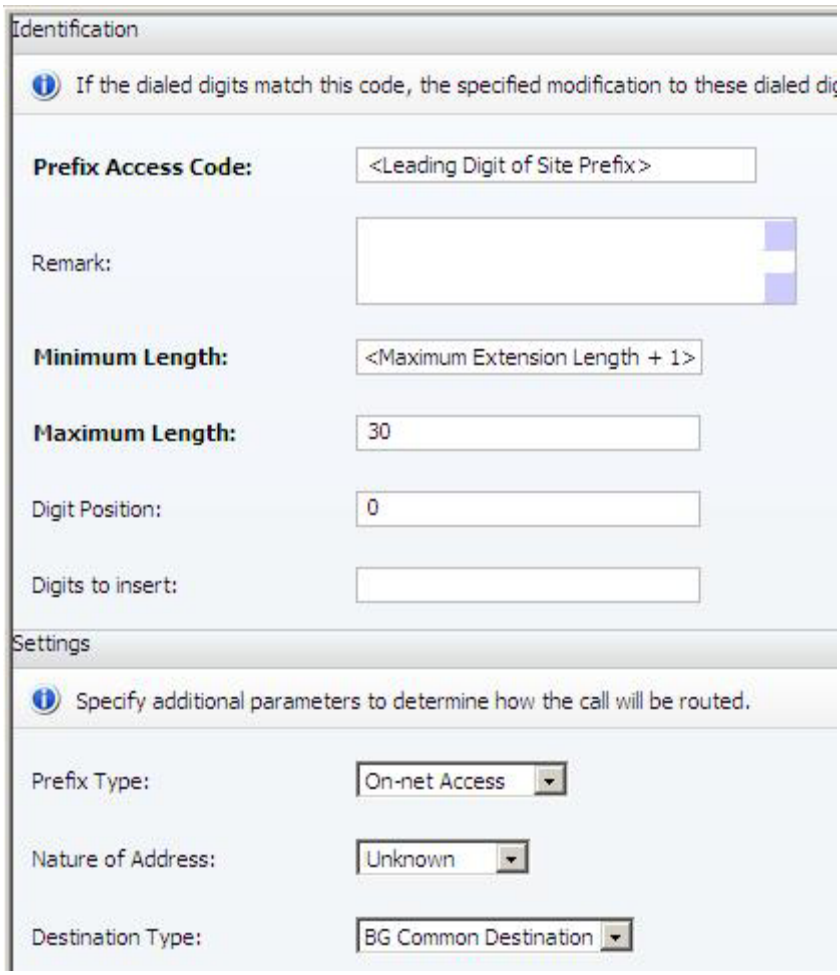
Site prefixes may be shared between sites.If shared, the Extension ranges are also shared by these sites.As an example, suppose 2 sites allow 4 digit extensions dialing between each other.Assume that the first site uses extension range 1000-1999 and the second site uses extension range 2000-2999.Assume they both receive Site Prefix 155. Each site will receive prefix access code entries for code 1 with length 4 and for code 2 with length 4 in their respective private numbering plan. The WebCDC tool will flag an error if the extensions shared between the sites are not unique.

### 2.3.1.2 Site Prefix Dialing Between Sites

Each site's numbering plan is set up to allow site prefix dialing to subscribers and/or PBX'es in other sites. As an OSV subscriber's private number is formed by the Site Prefix and the extension, this means that system-wide, any OSV subscriber can reach any other OSV subscriber by dialing their private number. No private network access code needs to be dialed when dialing an OSV subscriber's private number.




Each possible leading digit of a Site Prefix (Site Prefixes are not allowed to start with any of the Access Codes for outgoing lines) is sent to the NP_Common numbering plan for further treatment. For each leading digit, an entry is added in the NP_<Site Name> numbering plan with the following contents:



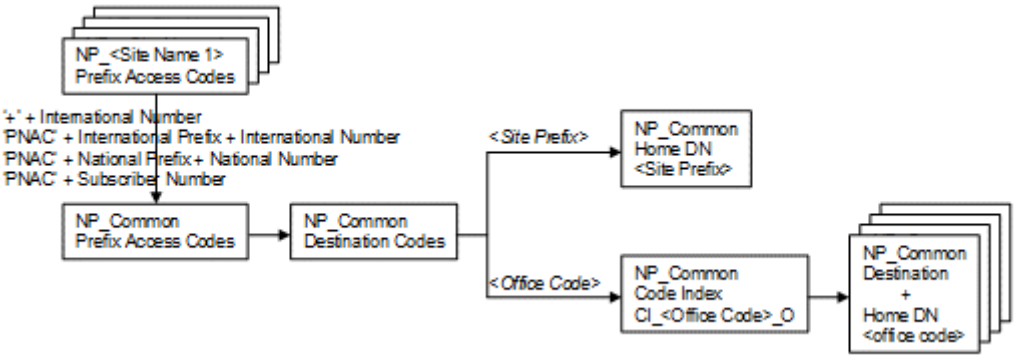

A dialed private number, matching this PAC entry will result in the private number being presented to the common numbering plan NP_Common.See Handling OSV Subscriber Numbers in the Common Numbering Plan for what happens further to these numbers.

In the event no site prefix was entered, the standard deployment dialing plan assumes that a default Site Prefix 123 is used. Because of the way DSS keys operate (dial the DSS Key number) and also because of OpenScape UC connectivity the resulting private number 123 combined with the site's Extensions range is also made dialable by providing above entry.

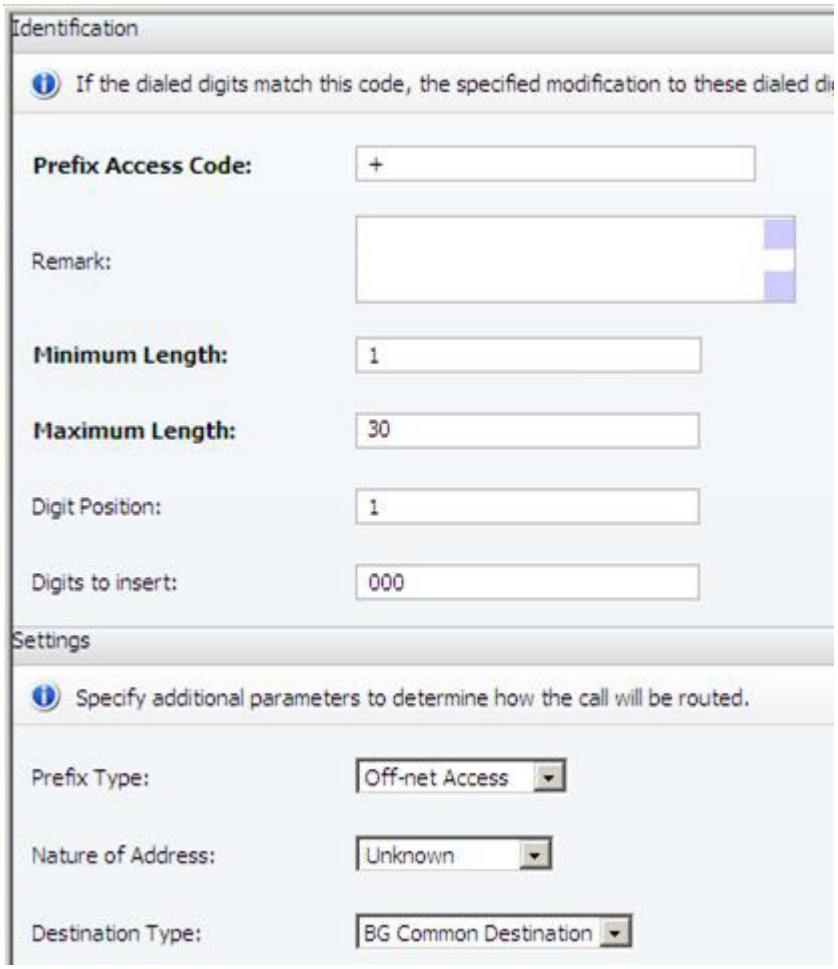
### 2.3.1.3 Public Number Dialing of an OSV Subscriber

For public number dialing of an OSV subscriber, the subscriber needs to be provisioned with a public number. If so, the standard deployment dialing plan offers 2 ways of dialing an OSV subscriber's public number:

- Dialing the Access Code for outgoing line followed by the OSV subscriber's local, prefixed national or prefixed international number.
- Dialing the OSV subscriber's GNF number (i.e. '+' followed by the international number).




Each site's numbering plan is set up to support '+' dialing, by entering a Prefix Access Codes table entry with Prefix Access Code '+' that sends the resulting number to the NP_Common numbering plan for further treatment **without any modification**.




The same treatment is given to the other ways of dialing an OSV subscriber's public number:

- A Prefix Access Codes table entry is added containing as Prefix Access Code the Site data sheet's "Access Code for outgoing line" followed by the international prefix used within the country where the site is located. For this entry, the Prefix Access Code is entirely stripped and replaced with common Prefix'+'.
- A Prefix Access Codes table entry is added containing as Prefix Access Code the Site data sheet's "Access Code for outgoing line" followed by a national prefix used within the country where the site is located. For this entry, the Prefix Access Code is entirely stripped and replaced with '+' and the "Country Code" of the site.
- A Prefix Access Codes table entry is added containing as Prefix Access Code the Site data sheet's "Access Code for outgoing line", provided subscriber line dialing is supported by the site's country. For this entry, the Prefix Access Code is entirely stripped and replaced with '+' and the "Country Code" and "Area Code" of the

site. This entry is only added if the site's country supports subscriber dialing into the PSTN. A lot of countries have converted their dial plans to require national number dialing for any number in the country.

***INFO:*** In the NANP it is sometimes possible to dial 10 digit subscriber numbers. As these numbers already contain the Area Code, the Prefix Access Code is entirely stripped and replaced with '000' and the Country Code of the site.

So, how ever the OSV subscriber's public number was dialed, it is always sent to the NP_Common numbering plan as '+' followed by the OSV subscriber's public number. See Handling OSV Subscriber Numbers in the Common Numbering Plan for what happens further to these numbers.

***INFO:*** The above rules are not really just used for dialing an OSV subscriber's public number. They are of course used for any publicly dialed number (whether on-net or off-net) – that's the reason for the Off-net Access Prefix type.

### 2.3.1.4 DSS Key Dialing of an OSV Subscriber

The standard deployment dialing plan supports DSS key dialing. A DSS key always dials an OSV Subscriber's Directory Number. No modification of these kinds of number is necessary and therefore the rules created for Site Prefix Dialing of OSV subscribers will actually cover the DSS key dialing as well.

In each site's numbering plan any number starting with a digit between 1 and 9 that is not an extension is sent unmodified to the NP_Common numbering plan. The Minimum Length of these numbers is one more than the site's maximum extension number length and the Maximum Length is 30.

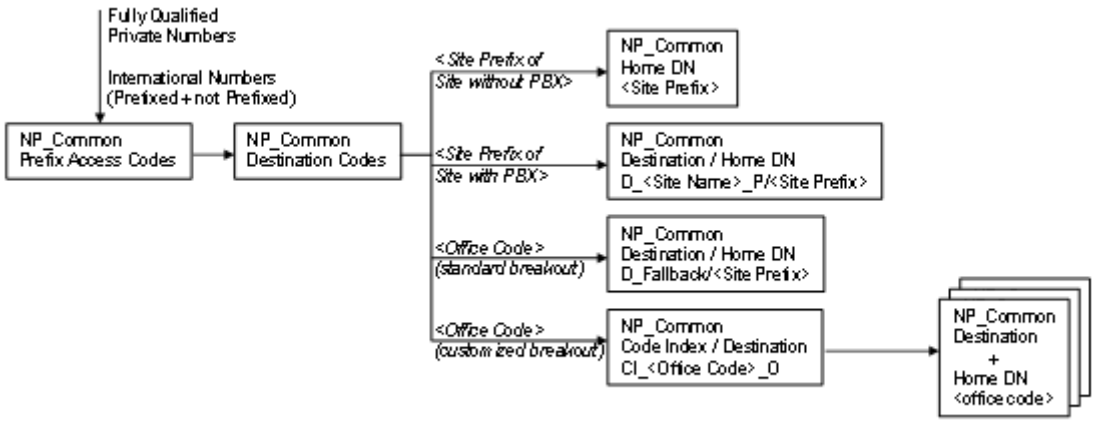
***INFO:*** One of the consequences for not allowing site prefixes to start with Access Codes for outgoing lines is that DSS keys will not operate for country codes that start with any of the numbers used as Access Codes for outgoing lines.

### 2.3.1.5 Handling OSV Subscriber Numbers in the Common Numbering Plan

Both extension dialing and site prefix dialing result in a fully qualified private number presented to the Prefix Access Codes table of the Common Numbering Plan.

Public number dialing results in a prefixed (000) number presented to the Prefix Access Codes table of the Common Numbering Plan.

Because of the way DSS keys operate, it is even possible that non-prefixed international numbers are presented to the Prefix Access Codes table of the Common Numbering Plan.




To find the OSV subscriber, the destination codes table of the common numbering plan or a Code Index of the common numbering plan needs to lead to one of the configured office codes. There are 3 issues that complicate this process:

- The Prefix Access Codes table of the common numbering plan cannot distinguish between a fully qualified private number and a non-prefixed international number. They both enter this table as unknown numbers.
- To find an OSV subscriber, the dial plan must lead to a subscriber's Directory Number. For subscribers that have a 'Direct Inward Dialing Number' specified in the Subscribers data sheet, the Directory Number is the subscriber's public number, so a fully qualified private number presented to the common numbering plan's Prefix Access Codes table needs to be converted to the public number assigned to the subscriber owning the private number. This is done in the common numbering plan's Prefix Access Codes table.
- Number ranges 'owned' by the OSV may not be contiguous:
  - Numbers within a number range may be shared with the public network.
  - Numbers within a number range may be shared with a PBX.

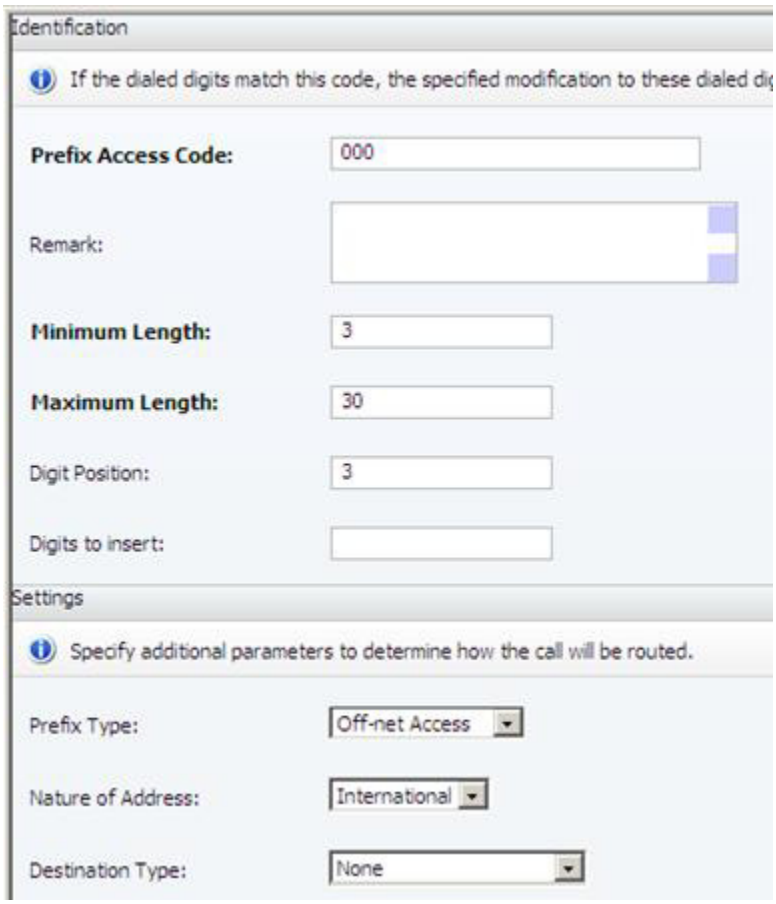
  OSV offers a convenient way to deal with these situations in that it allows configuring an office code together with a destination. In

such a construct, the OSV will first check whether the presented number matches a Home Directory Number configured for the office code.The destination is then only used when no matching Home Directory Number could be found.

### 2.3.1.6 OSV Subscribers in the Prefix Access Codes Table of the CNP

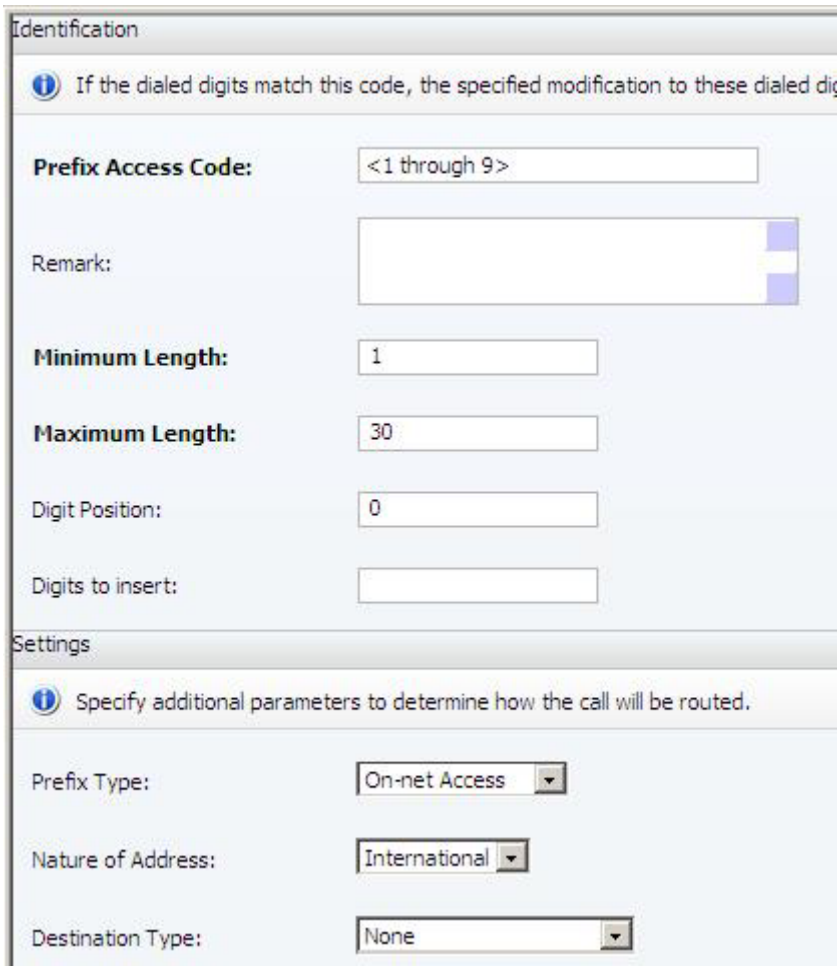
The Prefix Access Codes table of the Common Numbering Plan solves above issues number 1 and 2.For each standard deployment dialing plan it creates entries to implement the following default logic:

Numbers received from the site's numbering plans that start with '000' either belong to OSV subscribers with a Direct Inward Dialing Number or are intended for the public network. For these numbers the '000' is stripped and the result is sent as an International number to the NP_Common numbering plan's Destination Codes table.



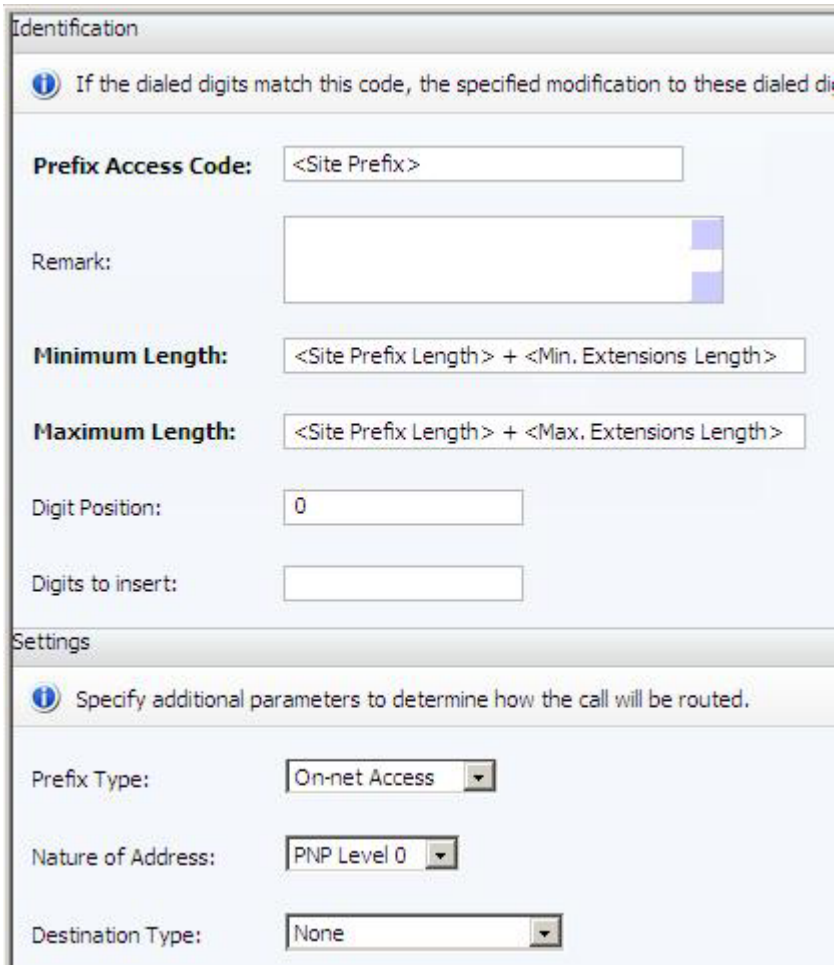
### 2.3.1.7 Distinguishing Private Numbers from Public Numbers

Distinguishing Fully Qualified Private Numbers from Fully Qualified Public Numbers is handled by considering all received numbers that don't start with 000 as non-prefixed International Numbers by default. They are sent unmodified as International numbers to the NP_Common numbering plan's Destination Codes table.




This takes care of all non-prefixed international numbers.

The issue is then closed by explicitly listing each site's Site Prefix together with the site's minimum and maximum extension length and sending these numbers unmodified to the NP_Common numbering plan's Destination Codes table as PNP Level 0 numbers.




This takes care of all fully qualified private numbers.

### 2.3.1.8 Converting Private Numbers to Public Numbers

Converting Fully Qualified Private Numbers to Fully Qualified Public Numbers is handled by analyzing the Subscriber DID Extension ranges assigned to a site's gateways. These rules must be more specific on the Prefix Access Code than the site prefix rules from issue number 1 above (else OSV will not accept the rule).Therefore the numbers in the Subscriber DID Extension range field of the Endpoints data sheet are broken down in blocks such that the tool ends up with full number blocks, i.e. for which all remaining digits (0-9, 00-99, 000-999, etc.) are present in the Subscriber DID Extension range. With this concept, an individual number listed in the Extensions range will receive an individual treatment.

Take for example the Subscriber DID Extension range for the site Munich: 0, 1000-1999.

- The number 0 is an individual number and will receive an individual treatment

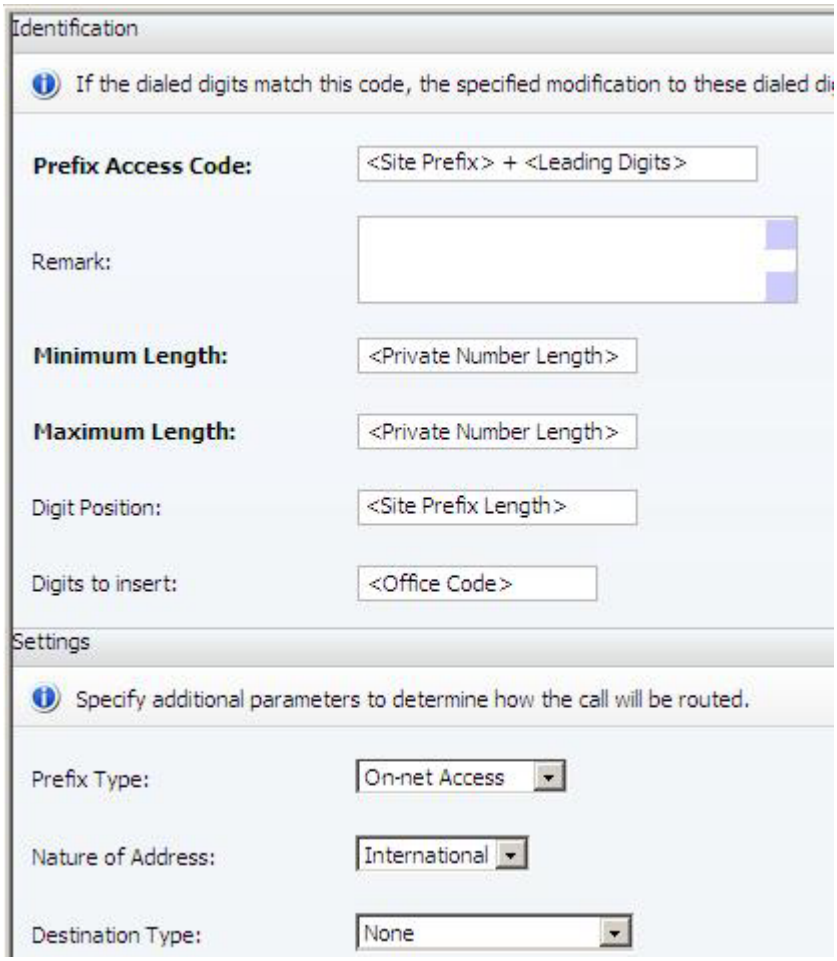
  - 70070 with length 5 will be converted to 49891230 by stripping the first 4 digits and inserting 4989123.
- The range 1000-1999 is a ‘1’ followed by a full number block with length 3 (000 – 999)
  - 70071 with length 8 (5 + 3 of the full number block) will be converted to 49891231 by stripping the first 4 digits and inserting 4989123.

**Note** that if the last range for the site Munich were 1000-1452, the ranges with full number blocks would be as in following table:

| **Range 1000-1452** | |
|---|---|
| **Leading Digits** | **Full Number Block Length** |
| 10 | 2 |
| 11 | 2 |
| 12 | 2 |
| 13 | 2 |
| 140 | 1 |
| 141 | 1 |
| 142 | 1 |
| 143 | 1 |
| 144 | 1 |
| 1450 | 0 |
| 1451 | 0 |
| 1452 | 0 |

So, depending on the ranges, the NP_Common Prefix Access Codes table may be quickly loaded with a lot of entries.

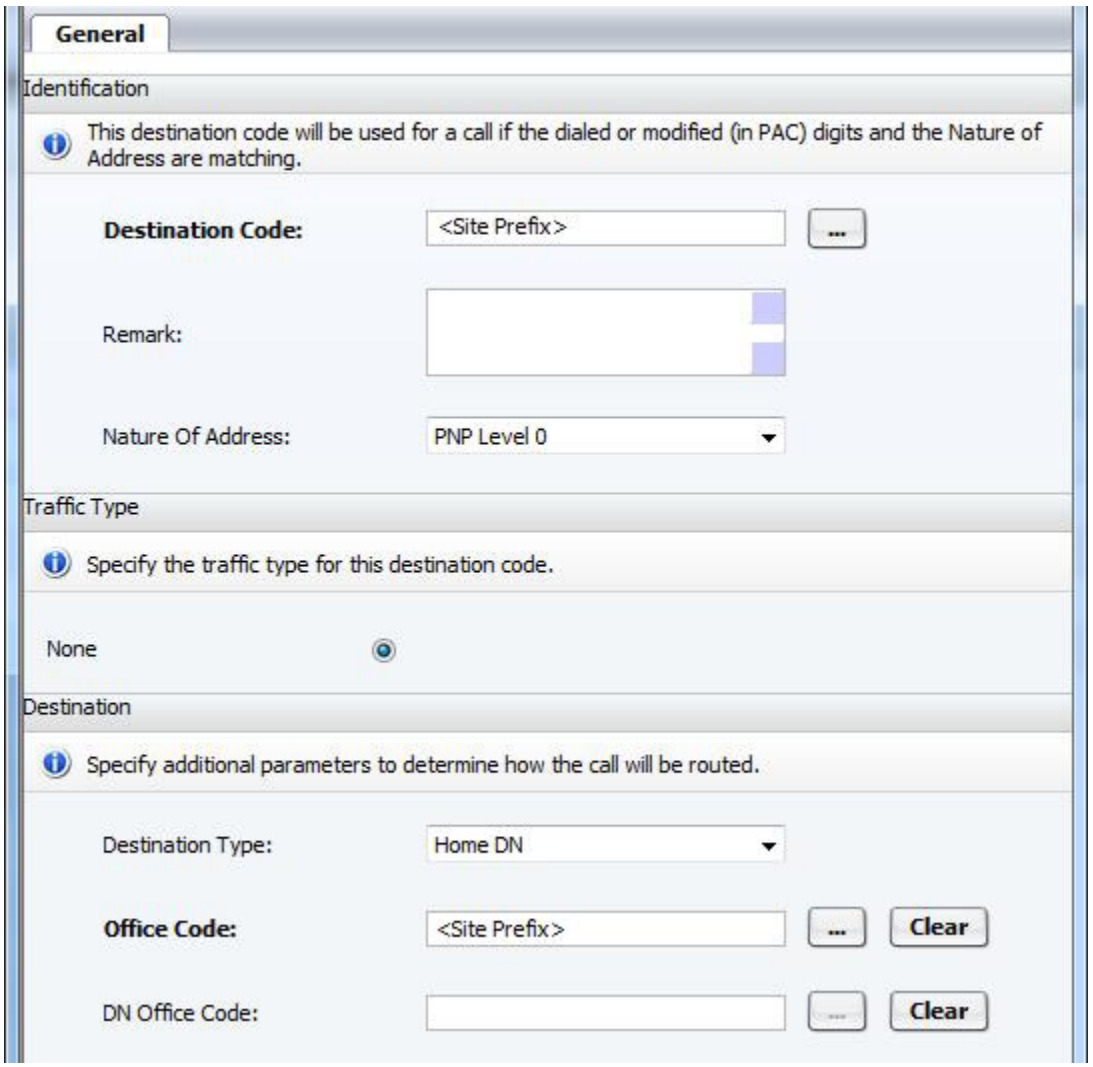
The rules created within the same site only differ on the prefix access code, the stripping and insertion of digits is always the same.



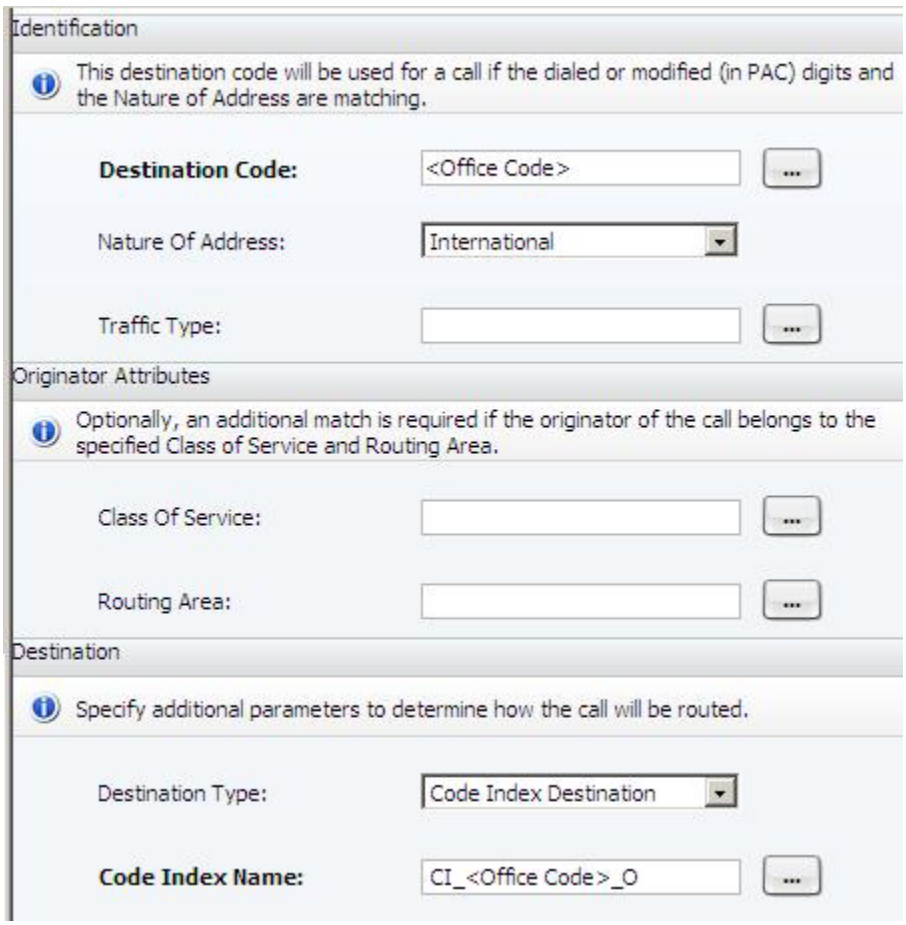

### 2.3.1.9 OSV Subscribers in the Destination Codes Table of the CNP

There are multiple possible scenarios. For each of these scenarios, the public office code is formed by the Endpoints data sheet's 'Country Code', 'Area Code' and 'Subscriber Code/Local Exchange Code' while the private office code is formed by the Site data sheet's 'Site Prefix'.

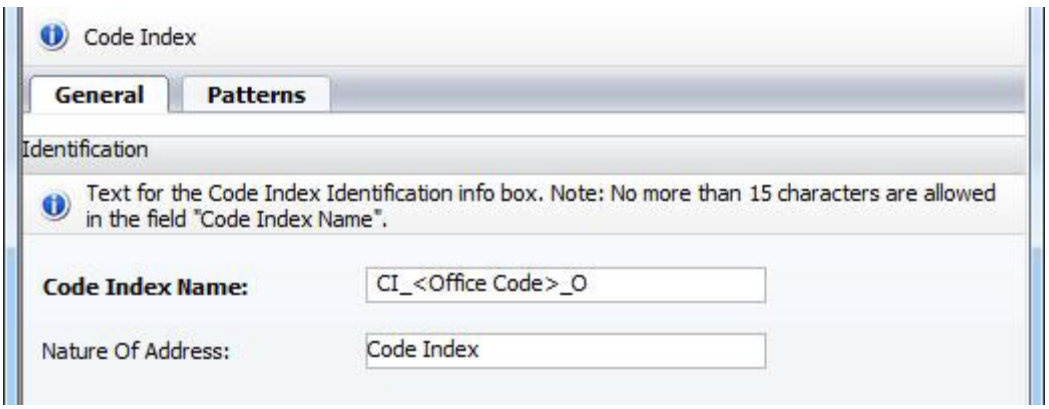
- In one scenario, an office code is completely owned by the OSV. This is true for all the private office codes defined by the 'Site Prefix' in the Sites data sheet where the Site does not have a PBX. For these office codes, an entry is added to the Destination Codes table of the NP_Common numbering plan that sends all L0 numbers beginning with a site prefix to the Home DN table of the office code with that Site Prefix.



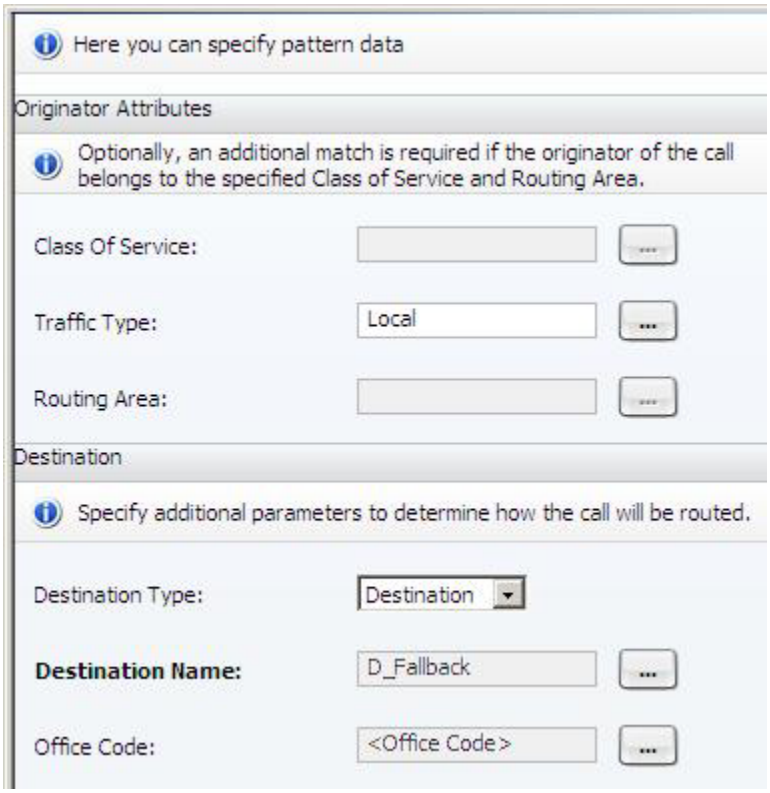

- In another scenario, an office code is shared with either a PBX or the PSTN. As the standard deployment sheets of the WebCDC tool pre-provision for this scenario, all public office codes are set up shared with the PSTN. Depending on the breakout strategy, the destination codes table in the NP_Common numbering plan points to either destinations (standard) or code indexes (customized) for all public numbers that enter this table.
  In the former case, the destinations for the public office codes are shared with the Home DN table.
  In the latter case, a special Code Index with name CI_<Office Code>_O is created for each public office code. Each code index pattern within the code index points to a destination D_<Office Code>_(S|A|N|I|Z) or D_Fallback which is shared with the Home DN table of the public office code.




With the code index CI_<Office Code>_O:




And within each pattern, the public office code is shared with the destination (e.g. D_Fallback):




### 2.3.1.10 Special Case - Borrowing Digits from the Public Office Code for the Extensions

In what follows, the term **public extension** is used when an extension is derived from a public number – i.e. is listed in the Endpoints data sheet. The term **private extension** is used when an extension is listed in the Extensions range of the Site data sheet and it is not an extension within the range of public extensions.

The extensions in use for a site are determined as follows:

- Primarily extensions are determined by the Subscriber DID Extension range field of all Gateway or Proxy and Gateway endpoints for the site in the Endpoints data sheet. If the Extension ranges field on the Site data sheet is not filled out, then these are the only extensions used within the site.
- If the Extension ranges field for the site is filled out, the WebCDC tool tries to find out whether digits are borrowed from the local office code by looking at the length of the numbers in the Extension range and comparing it to the length of the numbers in the Subscriber DID Extension range:
  - If the length of the smallest extension in the Extension ranges equals in size the length of the smallest extension of the Subscriber DID Extension range, then the extension ranges can simply be combined. Overlapping numbers are allowed in these

extension ranges – it simply means that these extensions are public extensions listed in the Sites' Extension ranges field.

– If the length of the smallest extension in the Extension ranges is greater in size than the length of the smallest extension of the Subscriber DID Extension range, then digits are borrowed from the local office code. **All** listed public extensions get the borrowed digits from the office code.

***INFO:*** The addition must lead to a consistent use of extensions within the site. The WebCDC Tool, however, does not verify this – it only looks at the length of the extensions in use and will automatically use this for the public extensions created for the site's DID numbers.

### 2.3.1.11 Special Case - Assigning Extensions Unrelated to the Subscriber's DID Number

Assigning an Extension to a subscriber that does not match the trailing digits of a subscriber's DID Number is allowed. This extension will be entered as Display Extension for the subscriber.

***INFO:*** The dial plan is not set up to translate Display Extensions that are unrelated to the subscriber's DID Number.

### 2.3.1.12 Special Case - Overlap between Extensions and Special Short Public Numbers

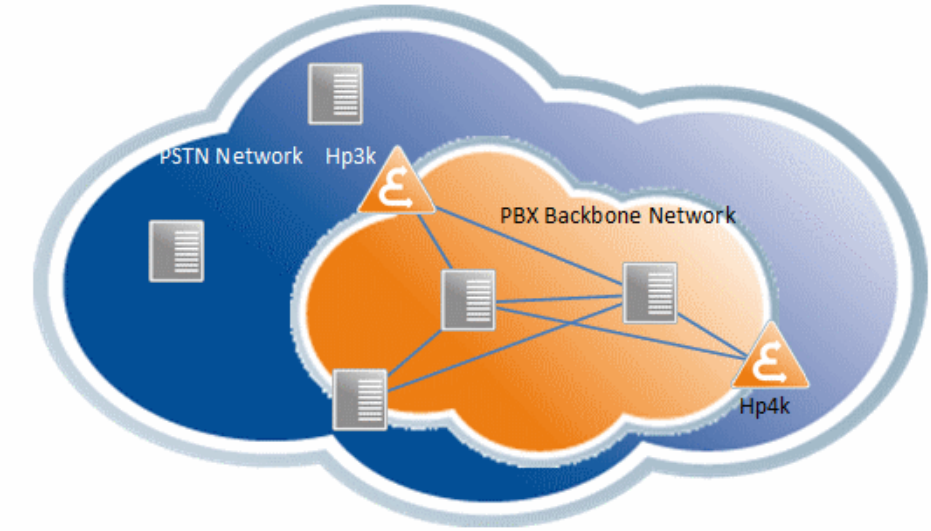
Emergency numbers and other public services are usually accessed using short numbers, e.g. 911 in USA, 112 in Europe, etc. The OpenStage family of phones has an entry to store the emergency numbers and will recognize if a number starts with an emergency number. This number will then be reformatted by these phones to the emergency number.

This means that extensions are not allowed to start with the emergency number digits. The WebCDC tool prevents the use of extensions that are emergency numbers or start with emergency numbers.

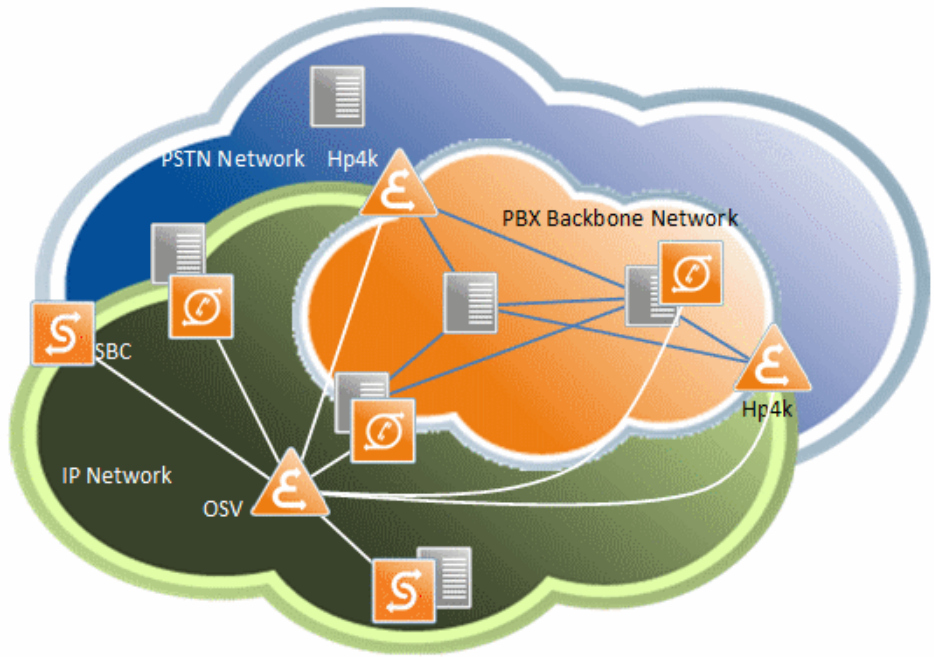
It is recommended to ensure that emergency numbers and extension numbers – both of which are short-dialed numbers – are strictly separated, preferably at the first digit already. In Europe don't start extensions with a '0' and in USA don't start extensions with a '9'. The WebCDC tool, however, offers no validation for these numbers.

## 2.3.2 Calling a PBX Subscriber

For many configurations the OSV is added into a network of classical TDM PBX's. These PBX's are connected to each other via leased lines (PBX Backbone network) and/or via the PSTN.




To bring an OSV into an existing TDM PBX network, IP to TDM gateways are added to connect OSV with the TDM PBX. If it needs to integrate with an IP PBX, then an SBC may be needed to connect with the IP PBX.OSV supports connecting directly with the HiPath3000 and HiPath4000 PBX's.




When an OSV is introduced in the network, the customer normally starts migrating subscribers off the PBX to the OSV. This migration usually happens several users at a time. Before all the subscribers are migrated, there are some subscribers present in the PBX's and some have been migrated to the OSV. In most cases the subscribers in the OSV have a phone number that once (before the OSV was there) did belong to the PBX. This means that, during the migration, for this site the same office code is used in the OSV and in the PBX and that the extensions of the site are distributed between the OSV and the PBX (shared office code).

Looking at above configuration it is clear that there is some flexibility when making an on-net call from an OSV subscriber to a subscriber in another site. Moreover this subscriber in the other site can be on the OSV or on the PBX. The normal routing for on-net calls will be through the WAN (Via the WAN).However, when it is desired to continue to use the PBX backbone to make calls between sites, the WebCDC tool offers an option to route calls from a site to other sites via the site's PBX backbone (Via the PBX). This option appears in the Site data sheet after setting the Special Customer Configuration in the General data sheet to the value Pbx-Migration. Just like OSV subscribers, PBX subscribers may have public or private numbers. OSV addresses these subscribers preferably by their DID number and only uses the private number (shortest form – only extensions and L0 numbers supported) if there is no DID number available.

---

***INFO:*** There is no way to enter the possible extensions supported by the PBX. It is assumed that these exten-

sions are of the same format as the extensions used by OSV subscribers. By definition, the WebCDC tool allows dialing extensions based on the length of the numbers in the Extensions range and Subscriber DID Extension ranges defined for a site. It allows dialing any number (0-9) between these lengths. If the number does not belong to an OSV subscriber and the number cannot be converted to a public number, then the number is sent in the shortest dialable format (extension or L0) to a site's PBX.

***INFO:*** The WebCDC tool does not support a closed extensions dialing plan that also involves sharing extensions with PBX's.

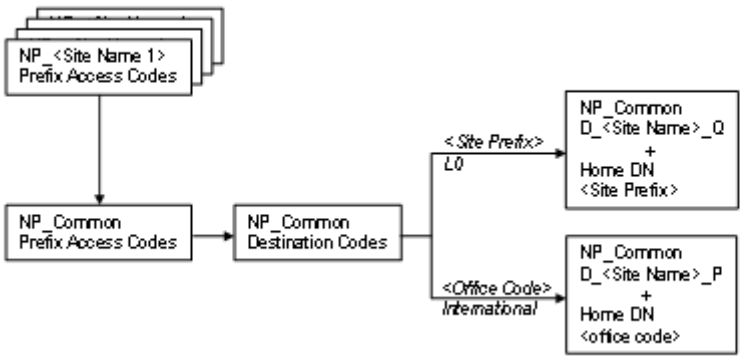
PBX subscribers can be reached via:

- Extension dialing
- Site Prefix dialing between sites.
- Public number dialing if the PBX subscriber has a Direct Inward Dialing Number – this way of dialing is mainly used for calls coming from the PSTN, but can also be used by the OSV subscribers.

The dialed numbers are handled in the private numbering plans exactly as when calling an OSV subscriber. The difference occurs in the destination codes table of the common numbering plan. When entering the destination codes table of the common numbering plan NP_Common, the PBX subscribers come in as:

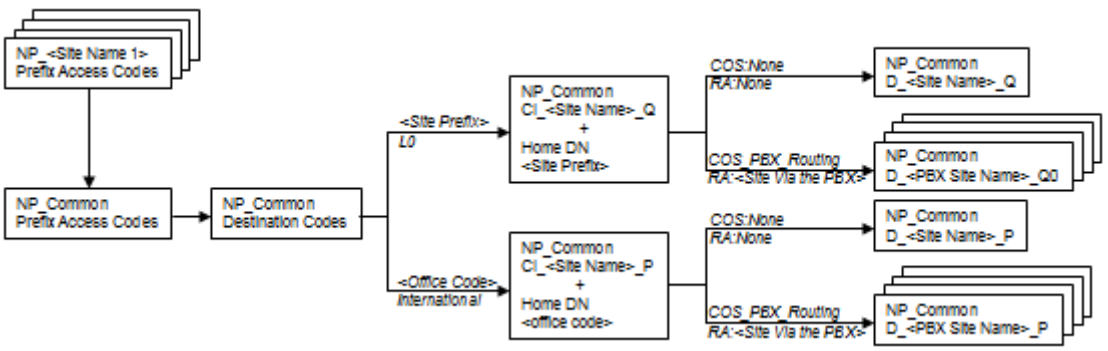
- L0 numbers for all PBX subscribers with private numbers only.
- International numbers for all PBX subscribers with DID numbers.

The solution in the destination codes table differs based on the configuration of the Routing of on-net non-OSV Calls in the Site data sheet. If this option is not available because it's not turned on in the General data sheet or if none of the sites is configured for routing the on-net non-OSV calls Via the PBX, then the solution is as follows for those sites that have a PBX defined:




- The destination D_<Site Name>_Q contains a route to the site's PBX. No number manipulation occurs on this route – i.e. the called number sent to the PBX is an International number.
- The destination D_<Site Name>_P also contains a route to the site's PBX. Via Number Manipulation, the <Site Prefix> is stripped from the L0 number – i.e. the called number sent to the PBX is an Extension number (with Unknown Nature of Address).

If any of the sites is configured for routing the on-net non-OSV calls Via the PBX, then the solution uses code indexes to identify these sites:




- The destination D_<Site Name>_P or D_<PBX Site Name>_P contains a route to the site's PBX.No number manipulation occurs on this route – i.e. the called number sent to the PBX is an International number.
- The destination D_<Site Name>_Q also contains a route to the site's PBX. Via Number Manipulation, the <Site Prefix> is stripped from the L0 number – i.e. the called number sent to the PBX is an Extension number (with Unknown Nature of Address).
- The destination D_<PBX Site Name>_Q0 also contains a route to the site's PBX. No number manipulation occurs on this route – i.e. the called number sent to the PBX is an L0 number.

**Note:** it is clear that for the latter solution, the PBX incorporation in the WebCDC dial plan relies on some factors in order to be successful. The site prefixes have to match with what the PBX believes to be its site prefix – leading to the restriction that setting the routing Via the PBX option only works if the PBX deploys an L0 private numbering plan. One setting that may help out in this situation if the PBX does not know the L0 codes, is to configure the “Set NPI/TON to Unknown” endpoint attribute on the PBX endpoint which will convert the L0 number to an unknown number (juts the NPI and TON are changed), but remember that this setting then also applies to the International numbers sent to the PBX.

**Note:** If a PSTN gateway is available as well in the site that uses a PBX backbone network, then that gateway shall be used for outgoing calls to the PSTN. Therefore, in this case, the office code for the public numbers used by a PBX may have to be broken down in ranges of numbers as shown in ‘Calling an OSV Subscriber – Converting Private Numbers to Public Numbers’.

## 2.3.3 Calling a PSTN Subscriber

The standard deployment dialing plan offers 2 ways of dialing a public number:

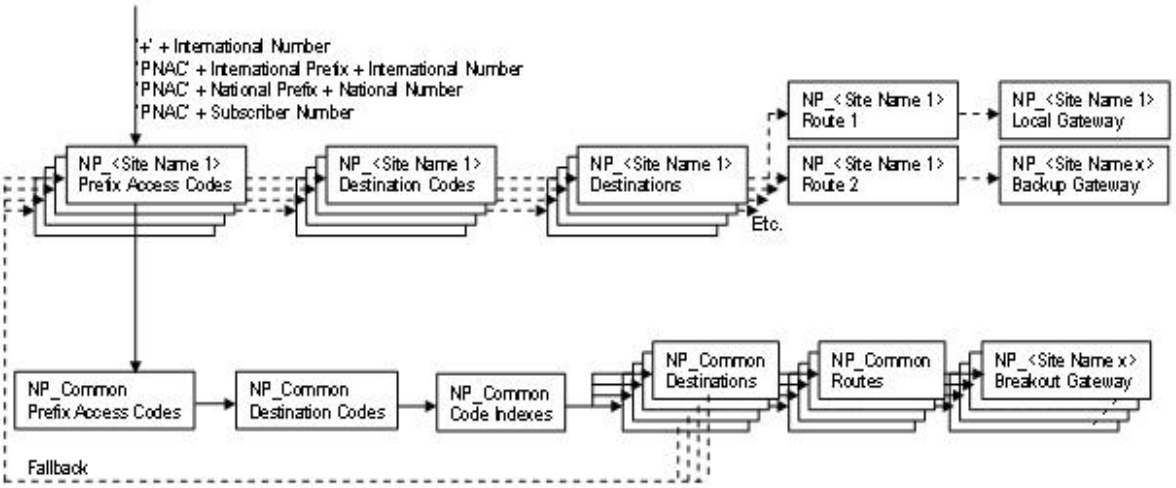
- Dialing the ‘Access Code for outgoing line’ followed by the PSTN subscriber’s local, prefixed national or prefixed international number.
- Dialing a GNF number (i.e. ‘+’ followed by the international number).

The WebCDC tool offers an option via the General data sheet to either create a standard dial plan for dialing PSTN subscribers or to create a customized dial plan. This is the Breakout Strategy option which can be set to Standard or Customized. The destination codes created by the setting of this option differ considerably.

### 2.3.3.1 Public Number Dialing of a PSTN Subscriber

The standard deployment dialing plan offers two ways of dialing a public number:

- Dialing the ‘Access Code for outgoing line’ followed by the PSTN subscriber’s local, prefixed national or prefixed international number.
- Dialing a GNF number (i.e. ‘+’ followed by the international number).

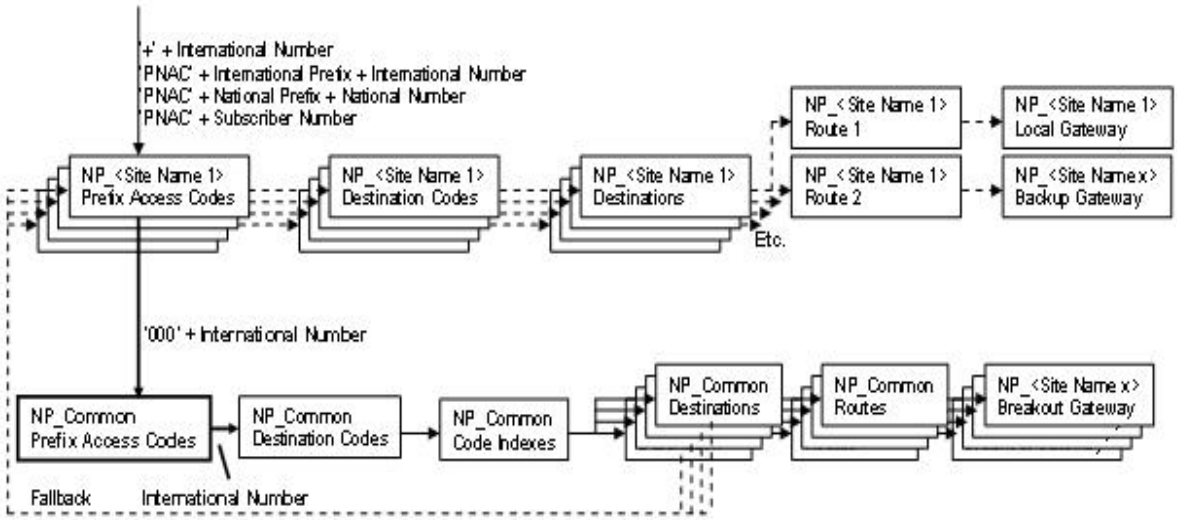



Each site's numbering plan is set up to support '+' dialing, by entering a Prefix Access Codes table entry with Prefix Access Code '+' and then sending the same number without any modification to the NP_Common numbering plan for further treatment.

The same treatment is given to the other ways of dialing an OSV subscriber's public number:

- A Prefix Access Codes table entry is added containing as Prefix Access Code the Site data sheet's 'Access Code for outgoing line' followed by the international prefix used within the country where the site is located. For this entry, the Prefix Access Code is entirely stripped and replaced with '+'.
- A Prefix Access Codes table entry is added containing as Prefix Access Code the Site data sheet's 'Access Code for outgoing line' followed by a national prefix used within the country where the site is located. For this entry, the Prefix Access Code is entirely stripped and replaced with '+' and the Country Code of the site.
- A Prefix Access Codes table entry is added containing as Prefix Access Code the Site data sheet's 'Access Code for outgoing line', provided subscriber line dialing is supported by the site's country. For this entry, for Non-US sites, the Prefix Access Code is entirely stripped and replaced with '+' and the Country and Area Code of the site. For the US sites, the Prefix Access Code is entirely stripped and replaced with GNF format for the DN determined based on the Local Toll Table specified as Destination in that Prefix code table entry.

So, whichever way the OSV subscriber's public number is dialed, it is always sent to the NP_Common numbering plan as '+' followed by the PSTN subscriber's public number.

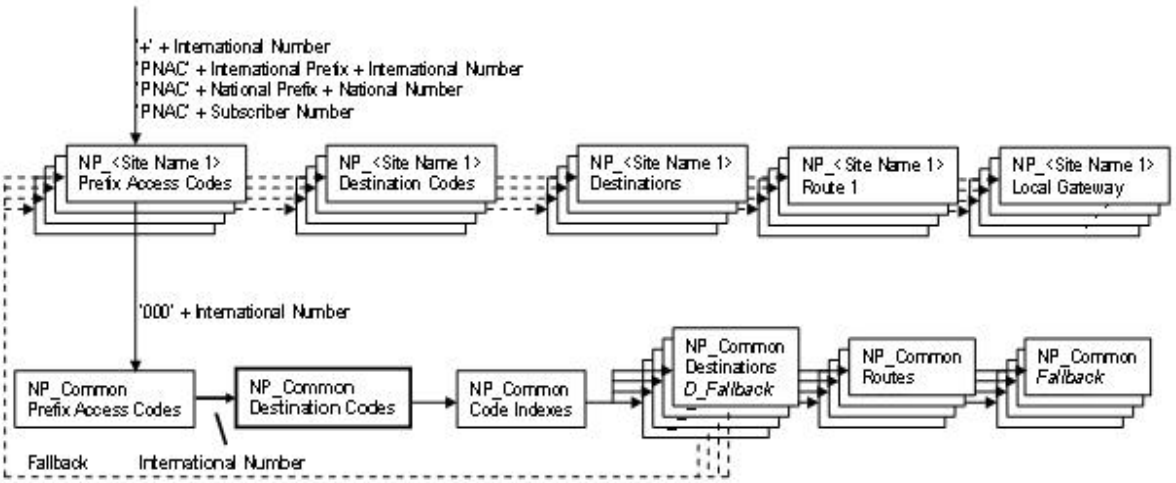



Numbers received from the site's numbering plans that start with '+' either belong to OSV subscribers with a 'Direct Inward Dialing Number' or are intended for the public network. For these numbers the '+' is stripped and the result is sent as an International number to the NP_Common numbering plan's Destination Codes table.

In the NP_Common numbering plan's Destination Codes table, things are handled differently based on what information is entered in the standard deployment basic sheets. There are basically 4 possible deployments for access to the PSTN with increasing complexity:

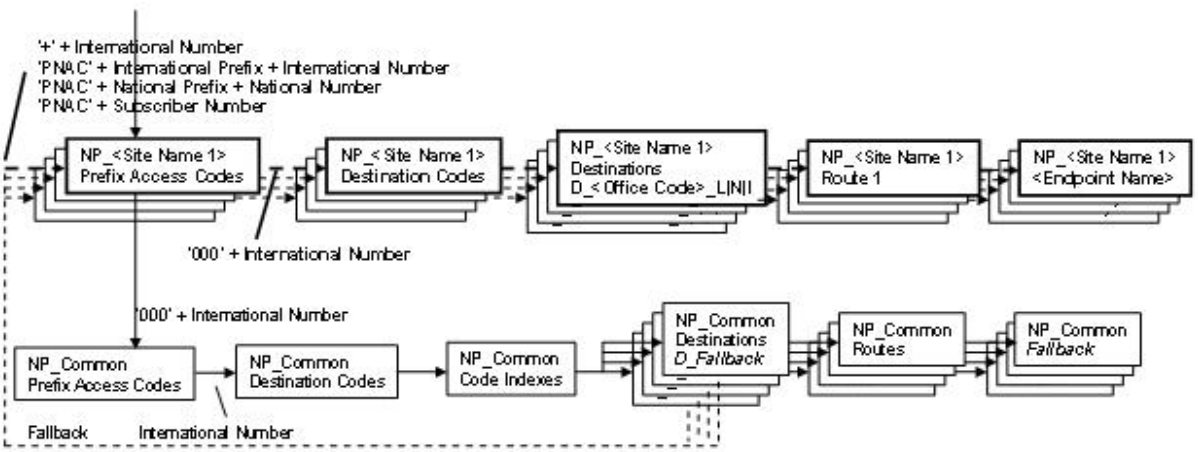
- Use only the local gateway.
- Use the local gateway and if that fails use a backup gateway located in another site.
- Use a gateway of another site before using the local gateway.
- Use a gateway of another site before using the local gateway and if all those fail use a backup gateway located in yet another site.

### Use Local Gateway




When no break out gateways are configured, the standard deployment, simply throws back the translation of the dialed number to the local numbering plan using the Fallback to Local Numbering Plan capabilities within the Route List of a Destination called D_Fallback. This destination contains a single route to a dummy endpoint named Fallback, defined in the NP_Common numbering plan.

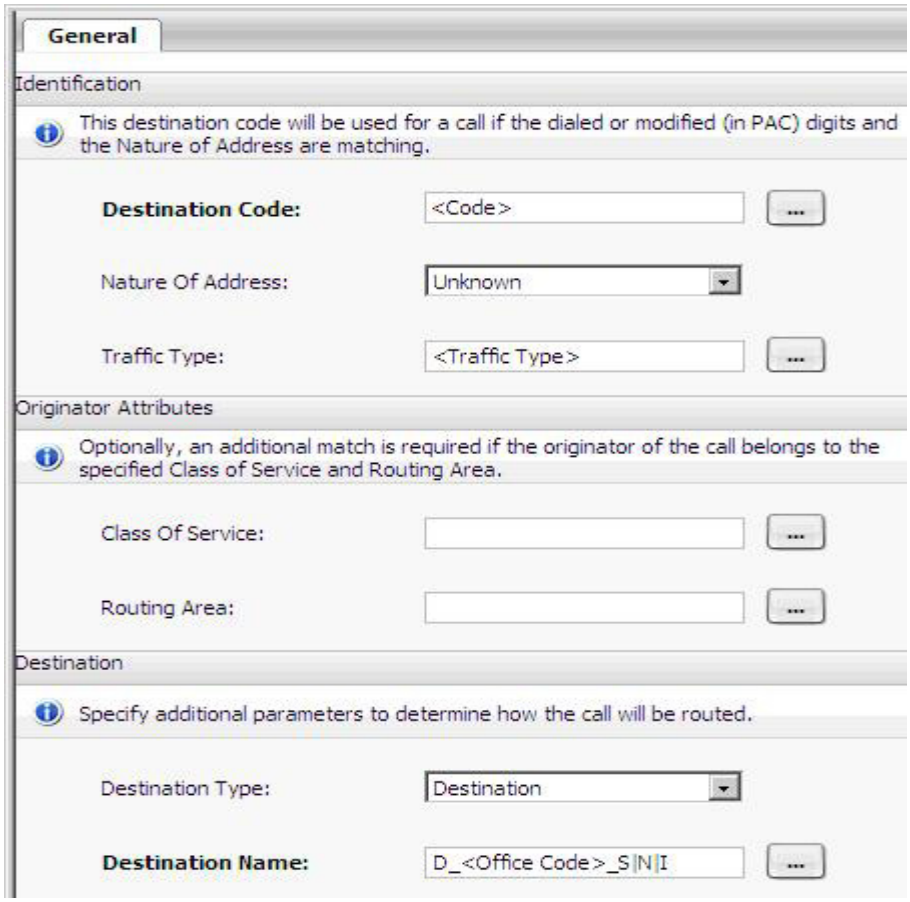
This construct will cause the initially offered number to be re-translated in the calling party's site's numbering plan – this time setting a marker within translation to ignore going to the NP_Common numbering plan. Note that a re-translation means that all information determined within the first translation via the NP_Common numbering plan is lost – including any digit manipulation in the NP_Common Prefix Access Codes table or traffic type determination in the NP_Common Destination Codes or Code Indexes table.



The same ‘+’ + International Number that ended up in the NP_Common numbering plan’s Prefix Access Codes table, now ends up in the site’s numbering plan’s Destination Codes table (but now without '+', as '+' is deleted by OSV internal translation logic before sending the number to Destination Code table).

In the Destination Codes table, the number dialed by the calling subscriber (or endpoint) is analyzed to determine the traffic type for the call, which must be one of:

- International: a set of destination codes for digits 1 to 9 are created that sets the Traffic Type to International and sends the number to a destination named D_<Office Code>_I with the exception if the digit is site's country code (for example, in case of US site '1' is country code). This destination has a single route with endpoint Endpoint Name of the site’s local gateway. On this route, insert digits are set to Access Code for outgoing line and international prefix of the site’s country and NOA is set to 'Unknown'.
- National: Except for US sites, a destination code for site’s Country Code’ is created that sets the Traffic Type to National and sends the number to a destination named D_<Office Code>_N. This destination has a single route with endpoint Endpoint Name of the site’s local gateway. On this route, insert digits are set to Access Code for outgoing line and national prefix of the site’s country and NOA is set to 'Unknown'. For US sites, the traffic Type is set to "TT_LocalToll" and sends the number to a destination named D_<Office Code>_T which has a route with digit maniuplation based on Local toll table defined for that route. For the US sites, the traffic type (National or Local) is determined based on the Local Toll Table associated with the Rate Area of the endpoint/subscriber making the call.
- Mobile: if the site’s country deploys a dedicated range of public numbers to be used as mobile numbers, one or more destination codes ‘site’s country’s mobile number range’ are created that set the Traffic Type to Mobile and send the number to above created D_<office code>_N destination.
- Local: if the site’s country supports local number dialing, a destination code ‘site’s Country Code + site’s Area Code’ is created that sets the Traffic Type to Local and sends the number to a destination named D_<Office Code>_S. This destination has a single route with endpoint Endpoint Name of the site’s local gateway. On this route, the ‘Site’s Country Code + Site’s Area Code’ is stripped off and replaced with the – for that site – determined Access Code for outgoing line.

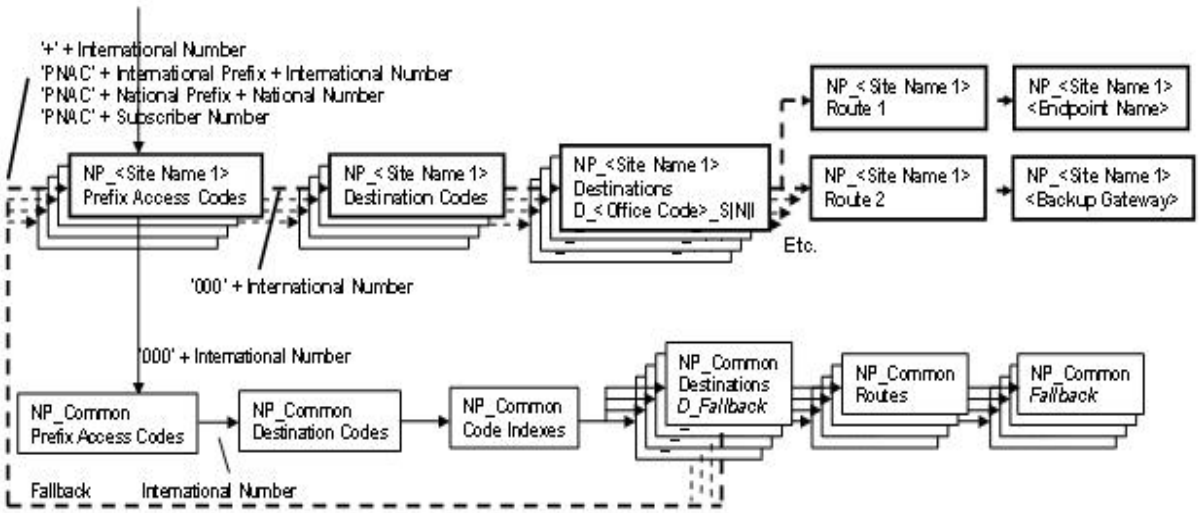



With: CC = country code, AC = area code, ACmob = Area Code for Mobile Numbers only, LOC = Local Exchange Code and <Office Code> = CCACLOC, PNAC = Access Code for outgoing line, IP = International Prefix and NP = National Prefix, the following is entered:

| Destination Code | Traffic Type | Destination | Route | | |
|---|---|---|---|---|---|
| | | | Endpoint | Delete | Insert |
| Codes 1 thru 9 (except the country codes) | International | D_SiteName_I | <Endpoint Name> | 0 | PNAC+IP |
| CC | National | D_SiteName_N | <Endpoint Name> | $CC_{Len}$ | PNAC+NP |
| $CCAC_{mob}$ | Mobile | D_SiteName_N | <Endpoint Name> | $CC_{Len}$ | PNAC+NP |
| CCAC | Local | D_SiteName_S | <Endpoint Name> | $CC_{len} + AC_{len}$ | PNAC |

### Use Local Gateway and Backup Gateway

This setting pretty much follows the same path as the ‘Use Local Gateway’ until the number gets retranslated in the site’s numbering plan:




In the site’s numbering plan’s Destination Codes table, the number dialed by the calling subscriber (or endpoint) is analyzed to determine the traffic type for the call, which must be one of:

- International
- National
- Mobile (country dependent)
- Local (country dependent)

The traffic type is determined in function of the office code of the site of the calling party.

As there’s now a backup gateway involved, the destinations that the numbers are sent to become a function of the office code of the site of the calling party and the site of the backup gateway. As the standard deployment dialing plan sends numbers prefixed and correctly formatted (prefixed local, national or international numbers), the following destinations are created depending on the location of the local and the backup gateway:

| Numbers (DN Codes) | Local gateway and Backup gateway are in the same area code of the same country | Local gateway and Backup gateway are in the different area codes within the same country | Local gateway and Backup gateway are in different countries |
|---|---|---|---|
| **Local Numbers of Local site** | D_<SiteName>_SS | D_<SiteName>_SN | D_<SiteName>_SI |
| **Local Numbers of Backup site** | | D_<SiteName>_NS | D_<SiteName>_IS |
| **National/Mobile Numbers of Local site** | D_<SiteName>_NN | | D_<SiteName>_NI |
| **National/Mobile Numbers of Backup site** | | | D_<SiteName>_IN |
| **International Numbers of Local and Backup site** | D_<SiteName>_II | | |

The created destination has the following logic:

D_<SiteName>_XY

- With <SiteName> the Country Code, Area Code, Subscriber Code/ Local Exchange Code of the site's endpoint in the Endpoints data sheet.
- With X, one of I (International), N (National) or S (Subscriber)
- With Y, one of I (International), N (National) or S (Subscriber)

With: CC = country code, AC = area code, ACmob = Area Code for Mobile Numbers only, LOC = Local Exchange Code and <Office Code> = CCACLOC, PNAC = Access Code for outgoing line, IP = International Prefix and NP = National Prefix and for the backup gateway: CCb = country code, ACb = area code, LOCb = Local Exchange Code, the following is entered:

- **Local gateway and Backup gateway are in the same area code of the same country:**

| Destination Code | Traffic Type | Destination | Route | | |
|---|---|---|---|---|---|
| | | | Endpoint | Delete | Insert |
| Codes 1 thru 9 (except the country codes) | International | D_SiteName_II | <Endpoint Name> | 0 | PNAC+IP |
| | | | <Backup Gateway> | 0 | $PNAC_b$+IP |
| CC | National | D_SiteName_N | <Endpoint Name> | $CC_{Len}$ | PNAC+NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| $CCAC_{mob}$ | Mobile | D_SiteName_N | <Endpoint Name> | $CC_{Len}$ | PNAC+NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| CCAC | Local | D_SiteName_S | <Endpoint Name> | $CC_{len}$ + $AC_{len}$ | PNAC |
| | | | <Backup Gateway> | $CC_{len}$ + $AC_{len}$ | $PNAC_b$ |

- **Local gateway and Backup gateway are in different area code within the same country:**

| Destination Code | Traffic Type | Destination | Route | | |
|---|---|---|---|---|---|
| | | | Endpoint | Delete | Insert |
| Codes 1 thru 9 (except the country codes) | International | D_SiteName_II | <Endpoint Name> | 0 | PNAC+IP |
| | | | <Backup Gateway> | 0 | $PNAC_b$+IP |
| CC | National | D_SiteName_N | <Endpoint Name> | $CC_{Len}$ | PNAC+NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| $CCAC_{mob}$ | Mobile | D_SiteName_N | <Endpoint Name> | $CC_{Len}$ | PNAC+NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| CCAC | Local | D_SiteName_SN | <Endpoint Name> | $CC_{len}$ + $AC_{len}$ | PNAC |
| | | | <Backup Gateway> | $CC_{len}$ | $PNAC_b$+NP |
| $CCAC_b$ | National | D_SiteName_NS | <Endpoint Name> | $CC_{len}$ | PNAC+NP |
| | | | <Backup Gateway> | $CC_{len}$ + $AC_{len}$ | $PNAC_b$ |

- A similar scenario happens when Local gateway and Backup gateway are in different countries

**Use a gateway of another site before using the local gateway (for standard breakout strategy)**

Using a gateway of another site before using the local gateway is called breaking out at another site in the WebCDC tool. Another name for this behavior is tail-end hop-off. The gateway of that site is called a break out gateway. In the standard breakout strategy, the central GW from the site defined in td Site sheet is used as breakout for all traffic types (local, national, and international calls). The destination and routes are spcified in the PNP destintion code table with te provisioning that central GW is tried before the local GW.

- Local gateway and Central gateway are in the same area code of the same country:

| Destination Code | Traffic Type | Destination | Route | | |
|---|---|---|---|---|---|
| | | | Endpoint | Delete | Insert |
| Codes 1 thru 9 (except the country codes) | International | D_SiteName_II | <Central Gateway> | 0 | $PNAC_c$ +IP |
| | | | <Endpoint Name> | 0 | PNAC+IP |
| CC | National | D_SiteName_N | <Central Gateway> | $CC_{Len}$ | $PNAC_c$ +NP |
| | | | <Endpoint Name> | $CC_{Len}$ | PNAC +NP |
| $CCAC_{mob}$ | Mobile | D_SiteName_N | <Central Gateway> | $CC_{Len}$ | $PNAC_c$ +NP |
| | | | <Endpoint Name> | $CC_{Len}$ | PNAC +NP |
| CCAC | Local | D_SiteName_S | <Central Gateway> | $CC_{len} + AC_{len}$ | $PNAC_c$ |
| | | | <Endpoint Name> | $CC_{len} + AC_{len}$ | PNAC |

- Local gateway and Central gateway are in different area codes within the same country. The entries for International, National, and Mobile traffic types will be same as in previous case. Other entries will be as shown in table below:

| Code | | | Endpoint | Delete | Insert |
|---|---|---|---|---|---|
| CCAC | Local | D_SiteName_NS | <Central Gateway> | $CC_{len}$ | $PNAC_c$+NP |
| | | | < Endpoint Name > | $CC_{len}$ + $AC_{len}$ | PNAC |
| $CCAC_c$ | National | D_SiteName_SN | <Central Gateway> | $CC_{len}$ + $AC_{len}$ | $PNAC_c$ |
| | | | < Endpoint Name > | $CC_{len}$ | PNAC+NP |

**Use a gateway of another site before using the local gateway and if all those fail use a backup gateway located in possibly yet another site.(for standard breakout strategy)**

This scenario will be combination of previous two sections.

- Local gateway, backup gateway, and Central gateway are in the same area code of the same country:

| Destination Code | Traffic Type | Destination | Route | | |
|---|---|---|---|---|---|
| | | | Endpoint | Delete | Insert |
| Codes 1 thru 9 (except the country codes) | International | D_SiteName_I | <Central Gateway> | 0 | $PNAC_c$ +IP |
| | | | <Endpoint Name> | 0 | PNAC+IP |
| | | | <Backup Gateway> | 0 | $PNAC_b$+IP |
| CC | National | D_SiteName_N | <Central Gateway> | $CC_{Len}$ | $PNAC_c$ +NP |
| | | | <Endpoint Name> | $CC_{Len}$ | PNAC +NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| $CCAC_{mob}$ | Mobile | D_SiteName_N | <Central Gateway> | $CC_{Len}$ | $PNAC_c$ +NP |
| | | | <Endpoint Name> | $CC_{Len}$ | PNAC +NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| CCAC | Local | D_SiteName_S | <Central Gateway> | $CC_{len}$ + $AC_{len}$ | $PNAC_c$ |
| | | | <Endpoint Name> | $CC_{len}$ + $AC_{len}$ | PNAC |
| | | | <Backup Gateway> | $CC_{len}$ + $AC_{len}$ | $PNAC_b$ |

- Local gateway, Backup gateway, and Central gateway are in different area codes within the same country. The entries for International, National, and Mobile traffic types will be same as in previous case. Other entries will be as below:

| Destination Code | Traffic Type | Destination | Route | | |
|---|---|---|---|---|---|
| | | | Endpoint | Delete | Insert |
| $CCAC_c$ | National | D_SiteName_S_1 | <Central Gateway> | $CC_{len} + AC_{len}$ | $PNAC_c$ |
| | | | <Endpoint Name> | $CC_{Len}$ | PNAC +NP |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| CCAC | Local | D_SiteName_S_2 | <Central Gateway> | $CC_{Len}$ | $PNAC_c$ +NP |
| | | | <Endpoint Name> | $CC_{len} + AC_{len}$ | PNAC |
| | | | <Backup Gateway> | $CC_{Len}$ | $PNAC_b$ +NP |
| $CCAC_b$ | National | D_SiteName_S_3 | <Central Gateway> | $CC_{len}$ | $PNAC_c$+NP |
| | | | <Endpoint Name> | $CC_{len}$ | PNAC+NP |
| | | | <Backup Gateway> | $CC_{len} + AC_{len}$ | $PNAC_b$ |

**Use a gateway of another site before using the local gateway (for customized breakout strategy)**

The names of the break out gateways to be used by the customer are recorded in the Breakout Endpoint row of the Breakout Endpoints data sheet. The use of the gateways by other sites is also recorded in this data sheet in the Breakout Selection rows. There are 3 Breakout Selection rows. Together with the site columns, these rows form the so-called breakout matrix. This matrix records for a given site, whether the listed endpoints in the Breakout Endpoints row for that site may be used by other sites for making local, national or international outgoing calls

- Breakout Endpoint for Local traffic: allow a site or country to make a local outgoing call
- Breakout Endpoint for National traffic: allow a site or country to make a national outgoing call
- Breakout Endpoint for International traffic: allow a site or country to make an international outgoing call

The matrix can be found back in its entirety in the Code Indexes table of the NP_Common numbering plan. To build a matrix of code indexes, the local, national and international traffic from the viewpoint of a site needs to be determined. This is done in the background through the

creation of local toll tables for each site's office code. For the NANP these local toll tables may become very complex, but for the rest of the world they are very simple.

There are 4 types of code indexes:

- One code index is created to handle all International break-out: CI_World.
- For each Country Code found in the endpoints in the Endpoints data sheet, another code index is created a code index is created as follows: CI_<Country Code>_N. This code index will handle all National break-out traffic.
- As the traffic type will be determined inside the code index, another code index CI_<Country Code>_M is created in case the country of the Country Code has specific area codes reserved for mobile numbers.
- For each Country Code and Area Code combination in the Endpoints data sheet, another code index is created as follows: CI_<Country Code><Area Code>_L1. This code index will handle all local break-out traffic.

In the NANP, the term local is actually defined by the local exchange code. Creating a code index per local exchange code is not possible and usually a whole range of exchange codes will be treated the same. For each group of exchange codes of an area code that is treated the same, a CI_<Country Code><Area Code>_Lx is created with x an increasing number starting with 1.

As these code indexes will be used by everyone, including those subscribers that are configured to use the local gateway first, the default code index pattern for any code index is towards the D_Fallback destination.

As the country codes, 1 and 7 exist as single digit country codes, the default code index pattern for these code indexes is CI_World.

To build up the destination codes table of the common numbering plan for tail-end hop-off, all possible codes and combinations for local, mobile, national and international traffic are listed and each unique combination receives a code index, that deals with how the numbers are treated from each site's viewpoint.

- Local Breakout

For each site, local numbers are formed by the common code consisting of the site's endpoint's Country Code and Area Code.

| Destination Code | Code Index | Code Index Patterns |
|---|---|---|
| CCAC | CI_CCAC_L1 | Lists sites that are allowed to break out locally at any of the sites with CCAC in the Office Code. |

- National Breakout

For each site, national numbers are formed by the common code consisting of the site's endpoint's Country Code and in case there are mobile area code ranges within the country codes using the Country Code and the mobile Area Code are used as well.

| Destination Code | Code Index | Code Index Patterns |
|---|---|---|
| CC | CI_CC_N | Lists sites that are allowed to break out nationally at any of the sites with CC in the office code. |
| $CCAC_{mob}$ | CI_CC_M | Lists sites that are allowed to break out nationally at any of the sites with CC in the office code. |

- International Breakout

For each site, international numbers are formed by the remaining codes 2 through 6, 8 and 9. They all receive the code index CI_World.

| Destination Code | Code Index | Code Index Patterns |
|---|---|---|
| 2 through 6 | CI_World | Lists sites that are allowed to break out nationally at any of the sites with CC in the office code. |
| 8,9 | CI_World | Lists sites that are allowed to break out nationally at any of the sites with CC in the office code. |

***INFO:*** The default code index pattern for CI_1_N and CI_7_N also points to the CI_World code index.

***INFO:*** The traffic types determined within the code indexes are set according to the relationship between the site from where the call is made (determined by COS/ Routing Area) and the site where the call breaks out to the PSTN.

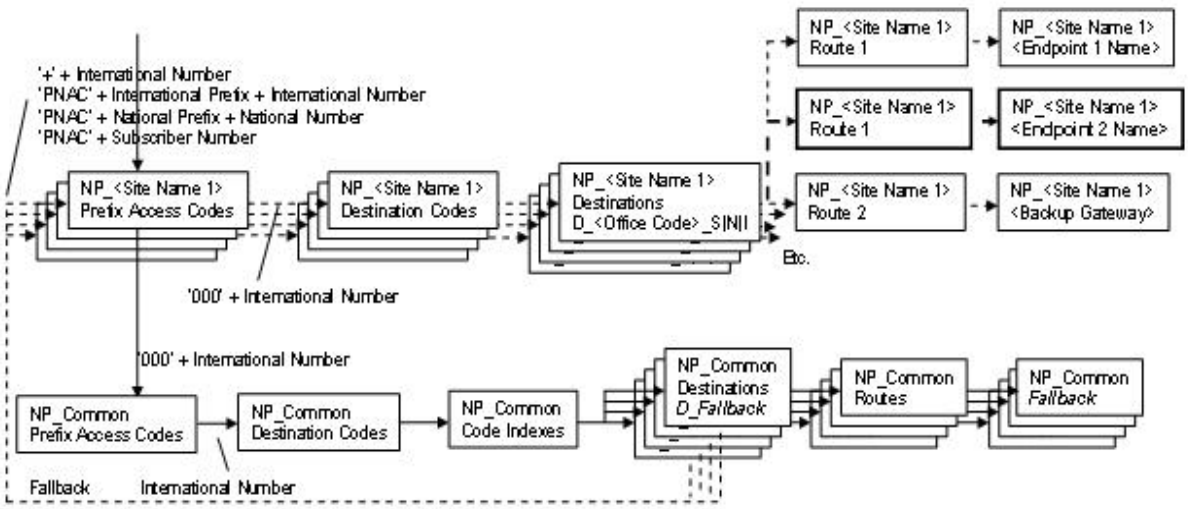
**Multiple Gateways deployed in a Site**

Each gateway deployed in a site shows up in a single row in the Endpoints data sheet. If multiple gateways are configured in the same site, they can be used as local gateways, backup gateways and breakout gateways:

| | Site Name --> | Munich | Hamburg | Hamburg |
|---|---|---|---|---|
| | Breakout Endpoint --> | EP_Munich | EP_Hamburg | EP_Hamburg2 |
| Breakout selection | Enter Site Name or Country Code that will use the Breakout Endpoint for Local traffic | | Munich | |
| | Enter Site Name or Country Code that will use the Breakout Endpoint for National traffic | | | Munich |
| | Enter Site Name or Country Code that will use the Breakout Endpoint for International traffic | | Munich | Munich |
| Backup | Enter Endpoint Name that will be used as Backup Endpoint | EP_Hamburg, EP_Hamburg2 | | |

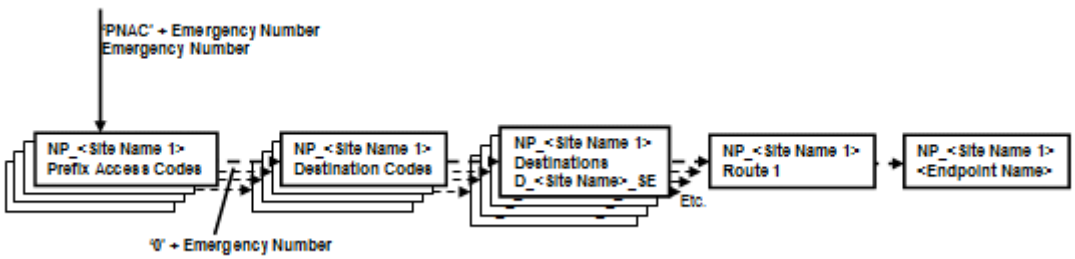
In the example, the Hamburg site has 2 gateways. Used as local gateways, they are assembled prioritized in the route set of any local destination within the Hamburg site. Both endpoints are used as backup endpoints for the Munich site, making the prioritized list within the Munich site: EP_Munich, EP_Hamburg, EP_Hamburg2. As both EP_Hamburg and EP_Hamburg2 are set up as breakout endpoints for the Munich site, the destination for international traffic for the Munich site in the CI_World code index contains routes to both EP_Hamburg and EP_Hamburg2. The Munich site makes local outbound calls in the Hamburg site through EP_Hamburg (reached via CI_4940_L1) while national calls within Germany (CI_49_N, CI_49_M) are made by the Munich site via EP_Hamburg2.

The following figure shows the handling of multiple gateways used as local gateways. Similar figures can be made for the use as backup or breakout gateways.




## 2.3.3.2 Emergency Call Handling

The WebCDC tool automatically creates rules for emergency numbers.




Emergency numbers are always routed to the local gateways only. They are never routed via breakout or backup gateways. The emergency calls receive the Emergency traffic type and the site's outgoing line access code is pre-pended before sending the call to the local gateway.

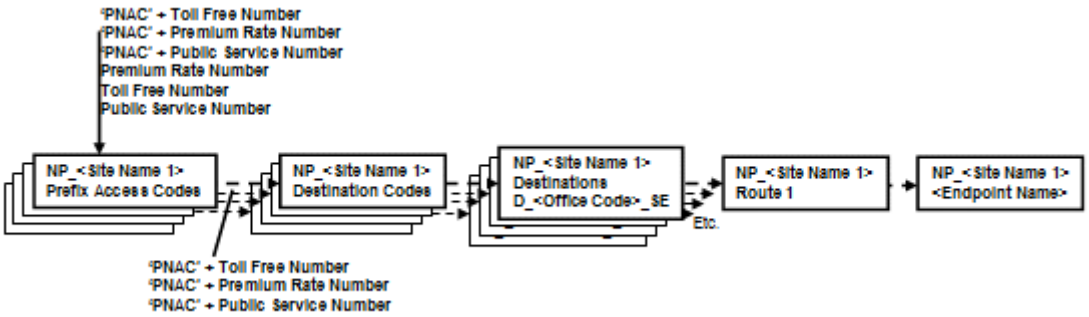
The destination created has the syntax D_<Site Name>_SE.

The emergency numbers are pre-defined per country and can only be changed via the Advanced sheets.

## 2.3.3.3 Special Number Handling

The WebCDC tool automatically creates rules for country-specific special numbers, such as Premium Rate and Toll Free numbers. These

numbers are sent in the same fashion as the emergency numbers (i.e. prefixed with outgoing line access code and possibly a national prefix if applicable) in a customized break-out scenario.

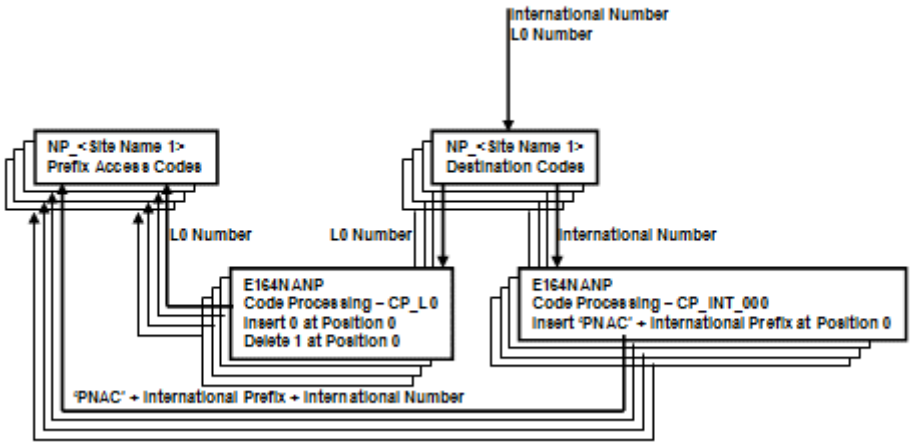



All these numbers are always routed to the local gateways only. They are never routed via breakout or backup gateways. The premium rate calls receive the Premium Rate traffic type. The toll free calls receive the Toll Free traffic type. Public service numbers are sometimes considered free of charge and then do not receive a traffic type (e.g. Germany). Sometimes, they are treated as local calls with traffic type Local assigned (e.g. USA).In any case, the relationship between the dialed service number and the type of traffic is pre-defined per country and can only be changed via the Advanced sheets. The destination created has the syntax D_<Site Name>_SE.

In a standard break-out scenario, these numbers are sent to a destination D_<Site Name>_SP with routes to central, local and backup gateways.

## 2.3.4 Handling Calls from SIP-Q endpoints

SIP-Q endpoints may send calls with the Called Party number in implicit (unknown type of number) or explicit (Subscriber, National, International type of number).Implicitly received numbers are dealt with the same as already described in sections ‘Calling an OSV Subscriber’ and ‘Calling a PBX Subscriber’. Explicitly received numbers need to be channeled through the same logic as described in these referenced sections. This is done through the use of code processing rules in the local destination codes tables:




This looks quite complicated but these rules simply pre-pend the site's Outside Line Access Code from the Site data sheet and the International Prefix defined for the country in which the site is located in front of an international number and offer the resulting number to the local numbering plan's prefix access codes table from where it will be treated as any other internationally dialed number. The Code Processing rule is applied to any international number within the site's destination codes table.

The same applies to L0 numbers received from the SIP-Q gateways. These numbers are simply retranslated without modification (the Insert/Delete rules on these code processing rules are simply a null operation and are only required because code processing does not support an empty code processing rule set) and are treated as any Fully Qualified Private Number dialed number – see also 'Calling an OSV Subscriber'.

## 2.3.5 PBX Migration (Routing Via PBX) Scenario

For many configurations the OSV is added into a network of classical TDM PBX's. These PBX's are connected to each other via leased lines and/or via the PSTN. In this configuration the OSV connects to these PBX's via a gateway (this gateway can be part of the PBX or is one of the gateways normally used to connect to the PSTN).

When an OSV is introduced in the network, the customer normally starts migrating subscribers off the TDM PBX to the OSV. This migration usually happens several users at a time. Before all the subscribers are migrated, there are some subscribers present in the classical PBX's and some have been migrated to the OSV. In most cases the subscribers in the OSV have a phone number that once (before the OSV was there) did belong to the PBX. This means that for this site the same office code is used in the OSV and in the PBX and that the extensions are distributed between the OSV and the PBX (shared office code).

Looking at the configuration it is clear that there is some flexibility when making a call from an OSV subscriber to a subscriber in another site (on-net call). Moreover this subscriber in the other site can be in the OSV or in the PBX. The requirements for routing to PBX subscribers in other branches are - Via the WAN or Via the PBX.

In V7 WebCDC introduced a new option for whether the configuration is to support 'Routing via network of PBXes' scenario. The WebCDC Std General sheet has a new option to ask 'Special Customer Configuration' with values "Standard" or "Pbx-Routing". If “Pbx-Routing” is chosen, then “Routing of on-net Non-OSV calls” must be enabled for the user input in the Site sheet and if “Standard” option is chosen, then “Routing of on-net Non-OSV calls” row will be hidden.

**Destination Codes in CNP:**

To enable the routing for PBX-Routing scenario, a class of service (COS_PBX_ROUTING) will be assigned to the subscribers of branches which has 'Routing Via PBX' flag set. Then, to handle the scenario when EXT1SIP (of one branch) calls EXT2SIP (of another branch), the corresponding entries in the CNP will be added as below (e.g. for an extension range in Boca branch):

```
DestCode=156192311, NOA=International, COS=COS_PBX_ROUTING,
DestType=DEST, DestName= Dest_Fallback, OfficeCode=1561923


DestCode=156192311, NOA=International, COS=COS_PBX_ROUTING,
RA=RA_BOCA, DestType=DEST, DestName=Dest_Boca,
OfficeCode=1561923


DestCode=156192311, NOA=International, DestType=DEST,
DestName=Dest_Boca, OfficeCode=1561923
```

The first entry means that for calls from all the subscribers with COS_PBX_ROUTING to given destination Code range will be routed via fallback rule if not found in OSV Home DN table. That means that the calls to non-migrated subscribers in Boca branch by a user of any other branch will be routed to its local PBX in that branch (see more description in next section) if that branch has “Routing Via PBX” option set. The second entry means that for calls from all the subscribers within Boca branch (RA_BOCA) to given destination Code range will be routed to PBX in Boca branch if not found in OSV Home DN table. That means that the calls to non-migrated subscribers in Boca branch by any OSV user of Boca branch will be routed to PBX in Boca branch irrespective of whether “Routing Via WAN” (see description of third entry below) or “Routing Via PBX” is selected for Boca branch.

The users of all other branches (“Routing Via WAN” option) who call the users in Boca branch will match the third entry as there is no COS value or RA value matched. For those calls, if the Boca users are migrated to OSV, then calls will terminate in the Home DN table. Otherwise, the call will be routed to PBX in Boca branch.

**Destination Codes in PNP (for fallback scenario):**

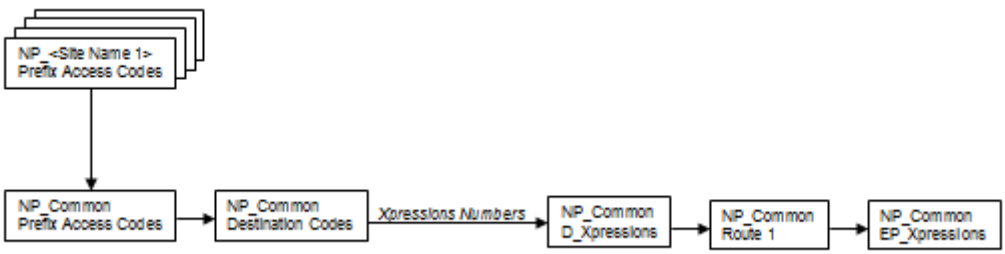
The fallback scenario in case of PBX-migration happens when a user of a branch (“Routing Via PBX” option) dials non-migrated users of other branches by calling SitePrefix+Extension (e.g. SP2_Extension).

Currently in the PNP PAC table, the SP2+Extension is sent to CNP PAC table. In the fallback case, this SP2+Extension will go to the PNP Destination code table with NOA=Unknown. To handle these cases, destination codes entries from 1 to 9 with NOA_Unknown are created which are routed to the PBX of that site. To enable this scenario a new destination is proposed with “_U” suffix which are assigned to destination codes with “NOA_Unknown”.

```
DestCode=1, NOA=NOA_Unknown, DestType=DEST, DestName=
Dest_<SiteName>_U


DestCode=2, NOA=NOA_Unknown, DestType=DEST, DestName=
Dest_<SiteName>_U


DestCode=8, NOA=NOA_Unknown, DestType=DEST, DestName=
Dest_<SiteName>_U


DestCode=9, NOA=NOA_Unknown, DestType=DEST, DestName=
Dest_<SiteName>_U
```

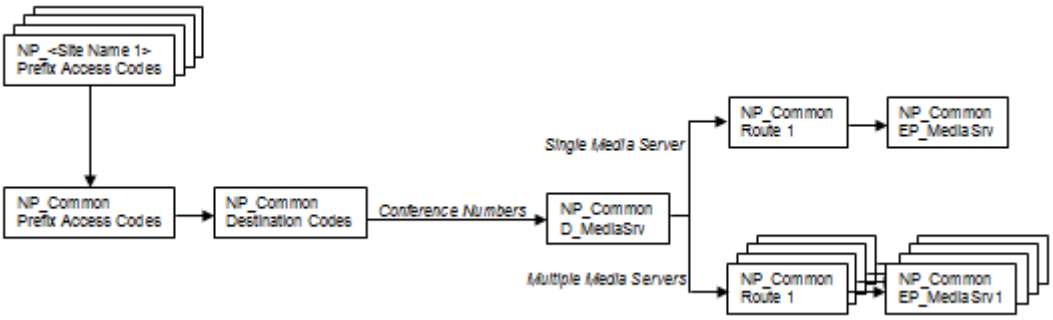
## 2.3.6 Routing for Xpressions

The Xpresssions numbers are routed via the regular translation rules set up for Calling an OSV subscriber until the common numbering plan NP_Common destination codes table, where the numbers recorded in the Site data sheet for Xpressions (direct access, guest/forward access, Callback access and transfer access) are routed to a destination D_Xpressions to a single route to the Xpressions endpoint EP_Xpressions.



## 2.3.7 Routing for Conference Media Server

The numbers recorded in the Site data sheet for Media Server Conference are routed to a destination D_MediaSrv to routes to the Media Server endpoints listed in the Central Media Servers field in the IP data sheet. Up to 4 media servers (comma-separated) can be configured there. If only 1 address is configured, the SIP endpoint created for this central media server is named EP_MediaSrv. If more than one address is listed, the SIP endpoints are numbered EP_MediaSrv1, …, EP_MediaSrv4.




## 2.3.8 Routing for Auto-Attendant

When specifying numbers in the auto-attendant public number field of the Site data sheet, the following scenarios can play out:

- No number is entered for the Main Site. If this is the case, the auto-attendant functionality of the Xpressions server is not used. All auto-attendant numbers that are entered for the other sites are:
  - Either routed to a subscriber if a subscriber exists with the specified number.
  - Or; routed to the auto-attendant configured on an OpenScape Branch proxy.
- A number is entered for the Main Site. This number is routed to Xpressions. Numbers entered for other sites are:
  - Either routed to a subscriber if a subscriber exists with the specified number.
  - Or; re-routed to the main site Xpressions number. An auto-attendant is configured on an OpenScape Branch proxy as well to be used for cases where the branch is in survivable mode.

## 2.3.9 Support for Carrier Code Dialing

In some countries (e.g. Brazil), the PBX needs to send a presubscribed carrier code to the PSTN service provider. These countries also may

allow the enterprise customers to dial carrier codes, similar to what the user is used to dialing from home. The carrier code dialed by the user is then replaced with the pre-subscribed carrier code before sending the call to the PSTN. The WebCDC tool supports such configuration as follows:

- To enable carrier code dialing, the Is Carrier Dialing Supported field in the General data sheet must be set to yes.
- To require the user of a specific site to enter a carrier code when dialing a PSTN subscriber number, the Do Carrier Codes need to be Dialed field must be set to yes in the Std, Site data sheet entry for the site that requires it. The call will fail if a user dials a PSTN subscriber's number without first entering the carrier access code. For international calls, the call may actually end up in a different country (as the dialed country code would be stripped off per default).
- The carrier code to be sent to the PSTN for national and international calls is entered in the Endpoints data sheet where the gateway to the PSTN is defined.

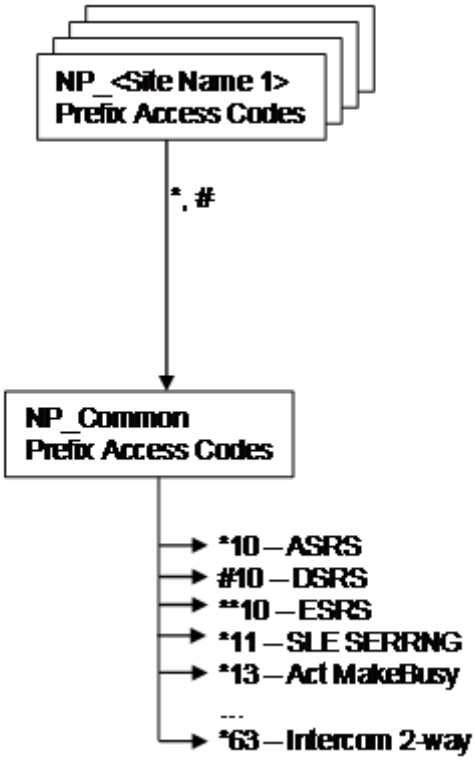
***INFO:*** At this time the same carrier code will be sent to the PSTN for national and international calls.

## 2.4 Feature Support

### 2.4.1 Dialing Service Access Codes

All Service Access Codes in the standard deployment dialing plan start with '*' or '#'.Service Access Codes can only be dialed implicitly and therefore only need to be handled within each numbering plan's Prefix Access Codes table.

In the standard deployment dialing plan, service access codes are handled in the Common Numbering Plan.




The following table shows all created service access codes (pattern starting with * or #).These access codes are sent directly to vertical service.

| Prefix AccessCode | Min.Length | Max. Length | Digit Pos. | Insert Digits | Nature of Address | Prefix Type | Dest. Type | Service Destination |
|---|---|---|---|---|---|---|---|---|
| 1234567890 | 10 | 30 | 10 | | Unknown | Vertical Service | Service | Conference Factory |
| *10 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | SRS Activate |
| #10 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | SRS Deactivate |
| **10 | 4 | 4 | 4 | | Unknown | Vertical Service | Service | SRS Edit |
| *11 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | Serial Ringing SLE |
| *13 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | Make Busy Activate |

| Prefix AccessCode | Min.Length | Max. Length | Digit Pos. | Insert Digits | Nature of Address | Prefix Type | Dest. Type | Service Destination |
|---|---|---|---|---|---|---|---|---|
| #13 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | Make Busy Deactivate |
| **13 | 4 | 4 | 4 | | Unknown | Vertical Service | Service | Make Busy Toggle |
| *14 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | Stop Hunt Activate |
| #14 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | Stop Hunt Deactivate |
| **14 | 4 | 4 | 4 | | Unknown | Vertical Service | Service | Stop Hunt Toggle |
| *20 | 3 | 5 | 3 | | Unknown | Vertical Service | Service | Speed Dial Individual |
| *21 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Speed Dial System 1 |
| *22 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Speed Dial System 2 |
| **201 | 5 | 30 | 5 | | Unknown | Vertical Service | Service | Speed Dial Ind. 1 Edit |
| **202 | 5 | 30 | 5 | | Unknown | Vertical Service | Service | Speed Dial Ind. 2 Edit |
| *30 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | PIN Edit |
| *31 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | HD Activate |
| #31 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | HD Deactivate |
| *40 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | CFU Activate |
| #40 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | CFU Deactivate |
| *41 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | CFB Activate |
| #41 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | CFB Deactivate |
| *42 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | CFNR Activate |
| #42 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | CFNR Deactivate |
| *43 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | CFVM Activate |
| #43 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | CFVM DeActivate |

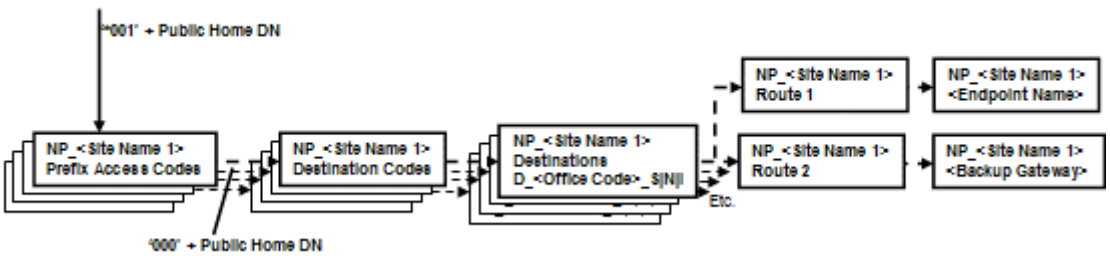
| Prefix AccessCode | Min.Length | Max. Length | Digit Pos. | Insert Digits | Nature of Address | Prefix Type | Dest. Type | Service Destination |
|---|---|---|---|---|---|---|---|---|
| *44 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | SCF SLE |
| *51 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | CID Suppression |
| #51 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | CID Delivery |
| *54 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | SCR SLE |
| *55 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | ACR Activate |
| #55 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | ACR Deactivate |
| *57 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | MCT |
| *58 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | SCA SLE |
| *6 | 2 | 2 | 2 | | Unknown | Vertical Service | Service | Callback Activate |
| #6 | 2 | 2 | 2 | | Unknown | Vertical Service | Service | Callback Deactivate |
| *60 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | LINR |
| *61 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | LONR |
| *7 | 2 | 2 | 2 | | Unknown | Vertical Service | Service | Call Pickup Orig |
| *70 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | Night Bell CPU |
| *81 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Account Code |
| *82 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Authorization Code |
| *9 | 2 | 2 | 2 | | Unknown | Vertical Service | Service | DND Activate |
| #9 | 2 | 2 | 2 | | Unknown | Vertical Service | Service | DND Deactivate |
| *90 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Executive Override |
| *71 | 3 | 8 | 3 | | Unknown | Vertical Service | Service | Park to Server |
| #71 | 3 | 8 | 3 | | Unknown | Vertical Service | Service | Park Retrieve |

| Prefix AccessCode | Min.Length | Max. Length | Digit Pos. | Insert Digits | Nature of Address | Prefix Type | Dest. Type | Service Destination |
|---|---|---|---|---|---|---|---|---|
| *72 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | SILM Monitor |
| *73 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | SILM Barge-in |
| *32 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | COSS Activate |
| #32 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | COSS Deactivate |
| *74 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Directed Call Pickup |
| *33 | 3 | 3 | 3 | | Unknown | Vertical Service | Service | DN Announcement |
| *62 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Intercom 1-Way |
| *63 | 3 | 30 | 3 | | Unknown | Vertical Service | Service | Intercom 2-Way |

## 2.4.2 Subscriber Rerouting

The WebCDC Tool uses code ‘*001’ as rerouting prefix for subscriber rerouting. It provisions the system for support of basic subscriber rerouting (due to WAN outage and due to CAC restriction).The configuration of DID pools for enhanced subscriber rerouting is done via the Advanced data sheets.

For subscriber rerouting a local gateway must be selected first as outbound gateway. A backup gateway may be selected as backup option in case the local gateway is unavailable.




It is clear that subscriber rerouting simply follows the exact same path as the fallback routing of dialed calls to the PSTN.

## 2.4.3 Speed Dial Lists

Speed dial lists can be entered in the standard deployment sheets on the Special Speed Dial Lists data sheet.

| Delta | | | |
|---|---|---|---|
| List Name | | Munich1 | |
| Entry No. | Number to dial | 00001 | +4989123456789 |
| Entry No. | Number to dial | 00002 | +15615551234 |
| Entry No. | Number to dial | | |
| Entry No. | Number to dial | | |
| Entry No. | Number to dial | | |

Speed dial list names can then be entered in the First Speed Dial List and the Second Speed Dial List fields of the Subscriber data sheet, The Speed Dial feature will be assigned and activated for the subscriber and the First/Second speed dial list name will be entered.

From a dial plan perspective, the speed dial list 1 and speed dial list 2 service access codes are pre-provisioned as *21 and *22 respectively.

## 2.4.4 Toll Restriction Service

The toll restriction service is activated for a subscriber with the standard class of restriction that represents the setting of the Subscriber Dialing Permissions in the Subscriber data sheet. Also see section ‘Classes of Restriction’ and ‘Dialing Permissions and Feature Profiles’.

## 2.4.5 Multi Line Hunt Groups

No special dial plan routing is generated for multi-line hunt groups. Multi-line hunt groups are addressed by calling the multi-line hunt group pilot number or master number, both of which are just regular Home Directory Numbers. See section ‘Calling an OSV Subscriber’.

## 2.4.6 Pickup Groups

Ringing calls can be picked up by group members using the pre-provisioned service access code *7.

## 2.4.7 Auto-Attendant

The WebCDC tool assumes that the headquarters auto-attendant is an Xpressions server, while the other site's auto-attendants are local auto-attendants on the OpenScape Branches used in survivable mode only or local attendant positions. The subscribers of a branch that don't have a private number and for which no External Caller ID is entered receive the site's auto-attendant number as their External Caller ID.

When dialed by a PSTN subscriber (or any other subscriber), the numbers of the satellite sites' auto-attendant numbers are linked to the headquarters site auto-attendant via the OSV dial plan (see also section 'Routing for Auto-Attendant').

To support this, the prefix access codes table of NP_Common receives entries for each non-headquarters site auto-attendant number, which is then completely erased and replaced with the headquarters site auto-attendant number.

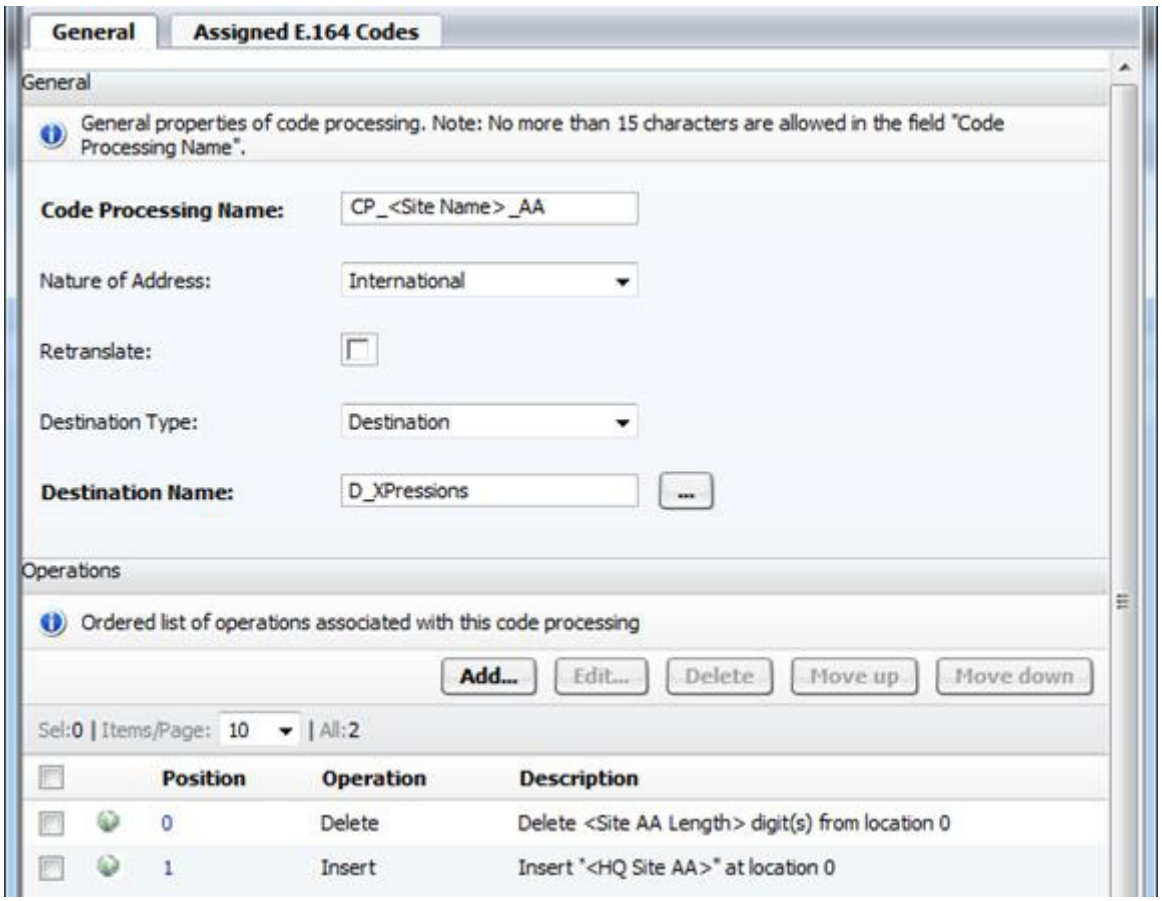
Above replacement is only done if an auto-attendant number is entered for the headquarters site.

---

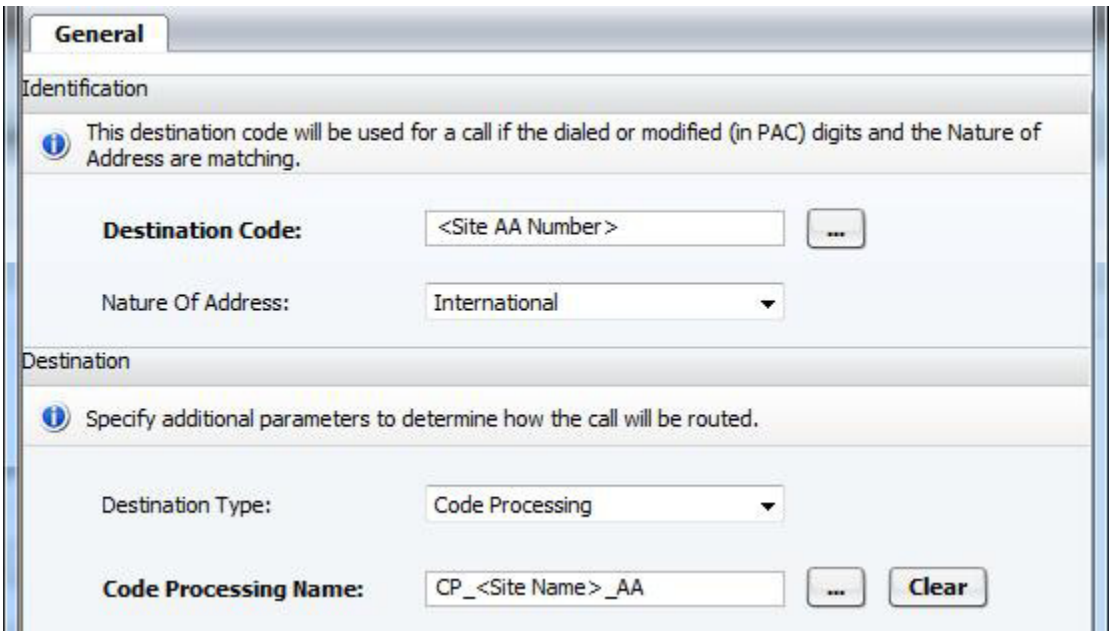
***INFO:*** **Warning:** the number of digits for the code of a prefix access code is limited to 15. As public dialed numbers enter the NP_Common numbering plan's prefix access code table with the prefixes 000, this means that there's the potential that the auto-attendant number has more than these 15 digits.The WebCDC tool will generate these entries with more than 15 digits, but OSV will not allow these entries to be created, resulting in a failure.

---

To support the functionality of replacing the dialed string with the headquarters site auto-attendant number, a code processing rule needs to be created that does the same replacement, but this time in the NP_Common destination codes table:




In the destination codes table a single destination code for Site AA number points to this Code Processing rule:

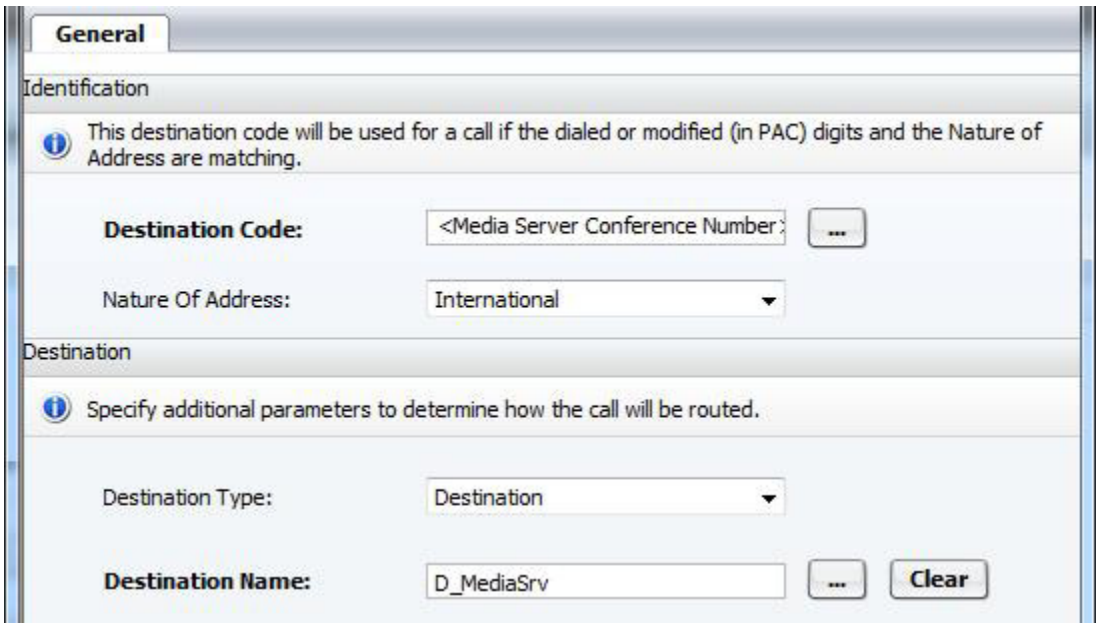



## 2.4.8 Conference Bridge

The service access code 1234567890 is pre-provisioned as conference factory number in the prefix access codes table of the NP_Common numbering plan.

| Topic | Headquarters / Site 1 | Site 2 |
|---|---|---|
| Xpressions Direct Access Number | 49891231995 | 4940234145 |
| Xpressions Guest/Forward Access Number | 49891231996 | 4940234146 |
| Xpressions Callback Access Number (UC VoiceMail) | 49891231997 | 4940234147 |
| Xpressions Transfer Access Number | 49891231998 | 4940234148 |
| Media Server Conference Number | 49891231999 | 4940234149 |

The international numbers entered as conference numbers in the Media Server Conference Number field on the Std.Site data sheet are entered in the NP_Common numbering plans destination codes table and point to the D_MediaSrv destination:

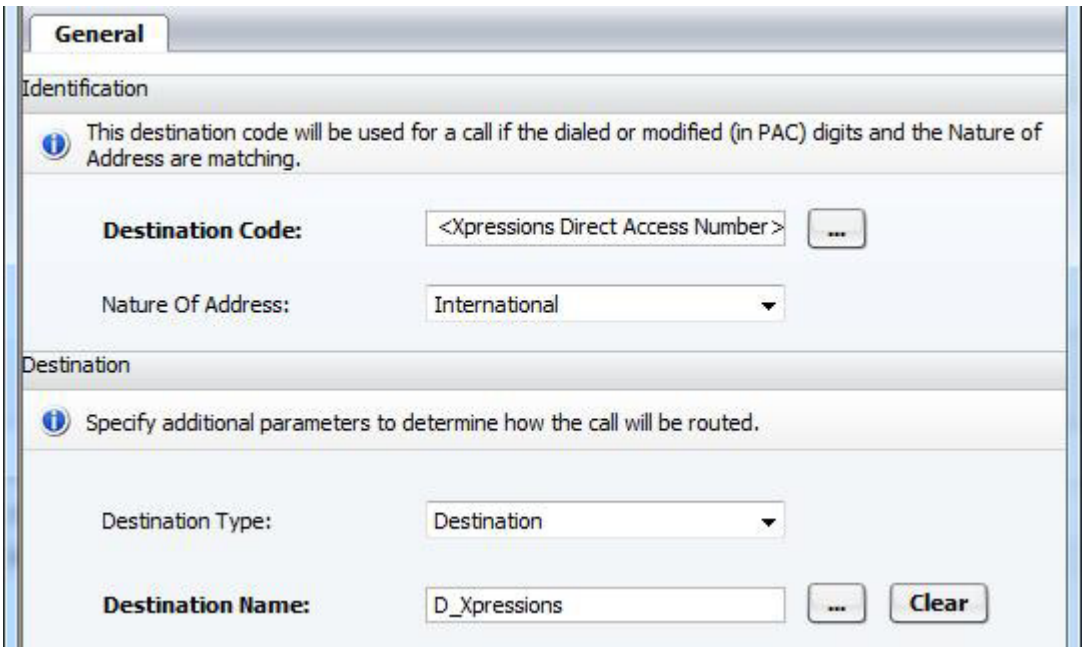



## 2.4.9 Xpressions

All numbers entered

| Topic | Headquarters / Site 1 | Site 2 |
|---|---|---|
| Xpressions Direct Access Number | 49891231995 | 4940234145 |
| Xpressions Guest/Forward Access Number | 49891231996 | 4940234146 |
| Xpressions Callback Access Number (UC VoiceMail) | 49891231997 | 4940234147 |
| Xpressions Transfer Access Number | 49891231998 | 4940234148 |
| Media Server Conference Number | 49891231999 | 4940234149 |

The international numbers entered as Xpressions numbers in the Xpressions Direct/Guest/Forward/Callback or Transfer Access Number fields on the Std.Site data sheet are entered in the NP_Common numbering plans destination codes table and point to the D_Xpressions destination (e.g. for Xpressions Direct Access Number):


General
Identification
This destination code will be used for a call if the dialed or modified (in PAC) digits and the Nature of Address are matching.
Destination Code:
<Xpressions Direct Access Number>
...
Nature Of Address:
International
Destination
Specify additional parameters to determine how the call will be routed.
Destination Type:
Destination
Destination Name:
D_Xpressions
...
Clear

# 3 Advanced Routing

The WebCDC tool allows entering call routing entries via two specific sheets:

- Call Routing
- Endpoints

Both sheets can be viewed by selecting from the WebCDC menus: Advanced > Show Advanced Sheets.

All OpenScape Voice call routing tables are generated from these two advanced WebCDC sheets.

# 4 Appendix

## 4.1 RTP Parameters

The Routing concept below requires following settings:

### 4.1.1 MwiEnablePrivateNumberingPlan

`Srx/Main/MwiEnablePrivateNumberingPlan = RtpTrue`

**Background:**

Is needed to enable MWI in the Xpressions numbering plan.

With this setting, the message waiting indication service will translate incoming MWI requests

from a VMS or from SIPQ using the private numbering plan assigned to the endpoint from

where the message originated.

### 4.1.2 rateAreaCosBasedLongestMatch

`Srx/Xla/rateAreaCosBasedLongestMatch = 1 (true)`

**Background:**

With this setting, a Destination Code pattern matches only, if all of the following parameters match:

- Prefix (Destination Code)
- Nature of Address (NOA)
- Class of Service (COS)
- Routing Area (RA)

Consider the following example:

| Destination Code | NOA | COS | RA |
|---|---|---|---|
| 4989 | International | COS_49_C | RA_49_89_7007 |
| 4989 | International | <none> | RA_49_89_7007 |
| 49 | International | <none> | <none> |

Now assume that a call enters the Destination Codes Table with a called number of 498972211111, a COS of COS_49_C and a Route Area=RA_49_30_222.

- If Srx/Xla/rateAreaCosBasedLongestMatch = 1, the first entry is not considered because the routing area does not match. The second

entry also doesn't match. The third entry matches and is used for further routing. For entries with the same length, the order of priority for selection is

  - 1. COS and Routing Area match
  - 2. Routing Area matches with empty COS
  - 3. COS matches with empty Routing Area
  - 4. COS and Routing Area are empty

- If Srx/Xla/rateAreaCosBasedLongestMatch = 0, only destination code and nature of address define which entry is used. In this case, the destination code International/4989 is the best match for the called number International/498972211111. However, since the routing area does not match, the call will fail.

### 4.1.3 InvokeRestrictionsOnRerouting

`Srx/Main/InvokeRestrictionsOnRerouting = RtpFalse`

**Background:**

With this setting the Toll Restriction Service shall not be invoked when a subscriber rerouting is executed. This allows the dial plan to be configured with different traffic types without needing to do anything special for the subscriber rerouting. Any traffic types determined by translation will simply be ignored for a subscriber rerouted call.

### 4.1.4 ConvertIntlToGNF

`Srx/Xla/ConvertIntlToGNF`

**Background:**

In V8 the value of RTP Srx/Xla/ConvertIntlToGNF is set to RtpTrue. This means, that the called party DN of calls from SIPQ endpoint with International NOA are converted in GNF format ('+' character is added) and then retranslated per the Universal Dial Plan Concept.

## 4.2 Dialing Permissions and Feature Profiles

OSV supports 6 subscriber dialing permissions which translate directly into the 6 Classes of Restriction of section ‘Classes of Restriction’.

| Subscriber Dialing Permission | Class of Restriction |
|---|---|
| Premium Rate | COR_Premium_Rate |
| International | COR_International |
| Mobile | COR_Mobile |
| National | COR_National |
| Local | COR_Local |
| Office | COR_Office |

These classes of restriction are then assigned to features for subscribers within their feature profile. The assigned feature profile depends on which features are assigned to a particular subscriber.

The 37 feature profiles that are created are:

| Feature Profile Name | COR assigned to CFR | COR assigned to TRS |
|---|---|---|
| FP_Standard_xxx | Yes | Yes |
| FP_Standard_Sec_xxx | Yes | Yes |
| FP_UC_xxx | No | Yes |
| FP_Analogue_xxx | Yes | Yes |
| FP_MLHG | No | No |
| FP_Standard_Pilot_xxx | No | Yes |
| FP_EA_xxx | No | Yes |

with xxx one of:

- Pre (premium rate)
- Int (International)
- Mob (Mobile)
- Nat (National)
- Loc (Local); or
- Off (Office).

# 5 Routing Concept: Abbreviations

| Abbreviation | Meaning |
|---|---|
| AC | Area Code |
| CC | Country Code |
| INT | Number in E.164 international format without any prefixes |
| LOC | Local Office Code |
| NOA | Nature of Address (Unknown, Subscriber, National or International) |
| RTP | Resilient Telco Platform |
| TT | Traffic Type |