Job Aid:
Separation of Bearer and Signaling for Avaya Communication Manager

The Separation of Bearer and Signaling (SBS) feature provides a Distributed Communications Service Plus (DCS+) like feature set using the Public Switched Telephone Network (PSTN) for bearer (voice) and QSIG private network signaling over a low cost IP Network for the signaling element of calls. SBS is available only with Avaya Communication Manager. The feature supports:

- QSIG private network signaling over an IP network
- Voice (bearer) calls over the PSTN using a variety of trunk signaling types (ISDN, CO, TIE, etc.)
- Correct association between QSIG feature signaling information and each bearer (voice) call.

Note:

There is no known standard that supports Separated Bearer and Signaling calls. This SBS feature is strictly a proprietary Communication Manager only implementation and does not interoperate with non-Communication Manager systems.

When a originating user dials a call that is routed to an SBS trunk, two different and separate calls are originated. One call carries the signaling portion of the call and the other carries the bearer portion of the call. The following is a high level description of a point to point SBS call. Refer to Typical Call Connections on page 2 for step-by-step descriptions of specific SBS call connections.

- A signaling call is setup between the SBS Originating Node and the SBS Terminating Node (SETUP and Call PROCEEDING messages). The initial SETUP message that is sent has the final destination extension number as the *called party*.
- The SBS Terminating Node, because the call was received on a SBS trunk group, selects a new extension type (SBS Extension) to use for the duration of the call setup. The SBS Terminating Node, using the *public unknown-numbering* table, constructs a Complete Number (area/city/extension) for the SBS extension. The SBS Terminating Node then pre-pends its country code to the Complete Number and sends this entire number (country code/area/city/extension) to the SBS Originating Node (INFO message) to allow the SBS Originating Node to establish the bearer call to the SBS Terminating Node.

- The SBS Originating Node receives the Complete Number from the SBS Terminating Node and compares the country code supplied to its own country code. If the country codes match it discards the country code, if they do not match the SBS Originating Node pre-pends its International Access Code to the Complete Number. The SBS Originating Node uses Automatic Route Selection (ARS) to launch a call to the SBS Terminating Node using the Complete Number. NOTE: ARS is always used to launch the bearer call and will use normal call routing (ars analysis to pattern/preference) to complete the call.
- The SBS Terminating Node receives the bearer call to the SBS extension. The SBS Terminating Node determines what SBS signaling call is currently using this particular SBS extension and provides a unique ID over the signaling call (INFO message) to the SBS Originating Node. The SBS Originating Node passes the unique ID back to the SBS Terminating Node, via DTMF digits over the bearer call. The SBS Terminating Node uses the DTMF unique ID to verify that the bearer call is the "correct" call to associate with the signaling call. Once the SBS Terminating Node has associated the signaling and bearer call it completes the call to the called party and returns an ALERTING message to the SBS Originating Node on the SBS signaling call.

Signaling for the SBS signaling call is the same as existing H.323 trunks using QSIG signaling with two exceptions. First, the SETUP and CALL PROCEEDING messages will contain Null Caps. Second, at least two INFO messages will be sent from the SBS Terminating Node to the SBS Originating Node to indicate the number to route the SBS bearer call to, and then the unique ID to signal on the SBS bearer call. These INFO messages will be sent after the CALL PROCEEDING, and prior to ALERTING. They will be encoded in a standard fashion, containing a Called Party Number - Information Element (IE).

Typical Call Connections

Four typical call connections are presented here.

- Point to Point call represents a SBS call between two Communication Manager systems. See Point to Point SBS Call Connections on page 3.
- Tandem SBS trunk call represents a SBS call between two Communication Manager systems (A to C) with an intervening Communication Manager system in between. The SBS signaling link tandems through the intervening (B) node. The SBS bearer call is direct from node A to node C. See Tandem SBS Call Connections on page 3.
- A SBS trunk interworked to a non-SBS trunk represents a call between two Communication Manager systems (A to C) with SBS functionality only available between nodes A and B. This call is interworked from SBS to a non-SBS QSIG trunk group at node B. See SBS to non-SBS QSIG Call Connections on page 4
- A non-SBS trunk interworked to a SBS trunk represents a call between two Communication Manager systems (A to C) with SBS functionality only available between nodes B and C. This call is interworked from non-SBS QSIG trunk group to SBS at node B. See PRI Non-SBS to SBS Call Connections on page 4

Figure 1: Point to Point SBS Call Connections

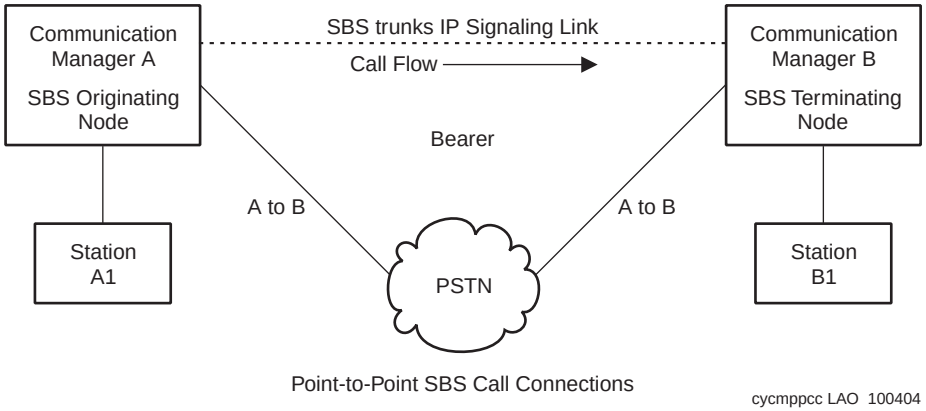


Figure 2: Tandem SBS Call Connections

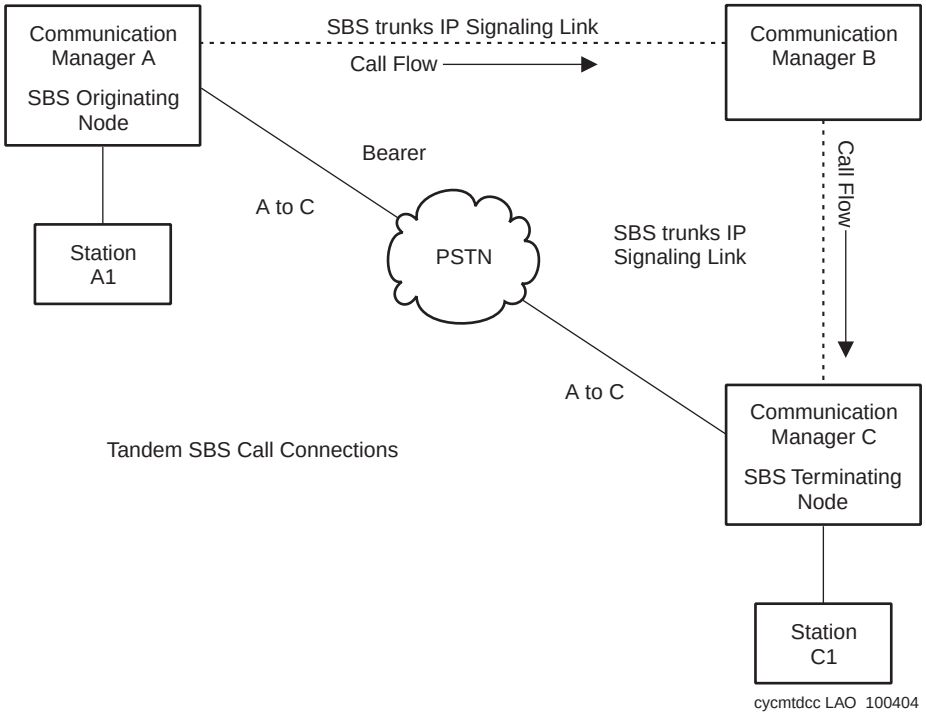


Figure 3: SBS to non-SBS QSIG Call Connections

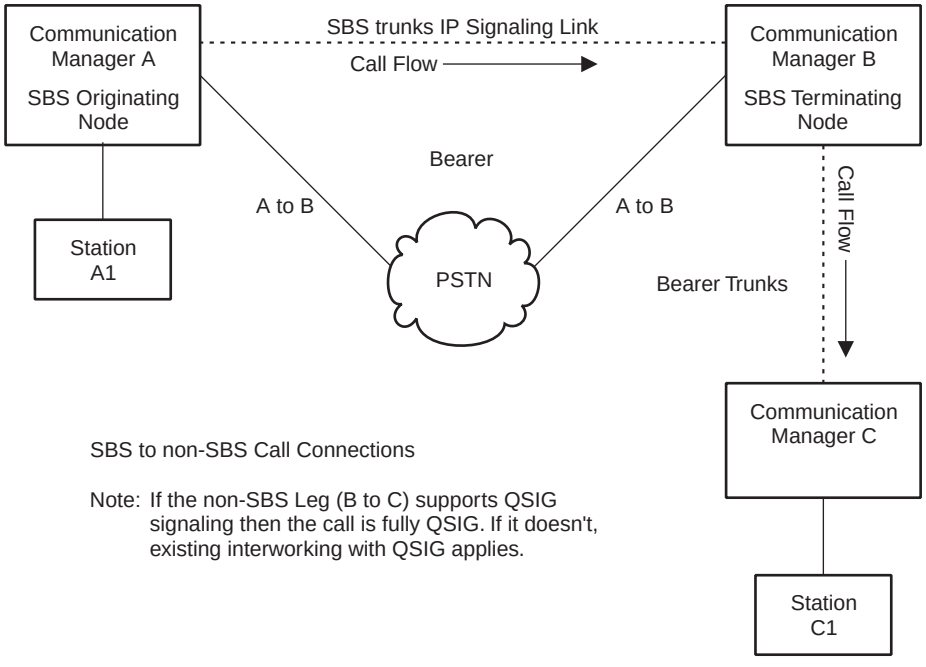
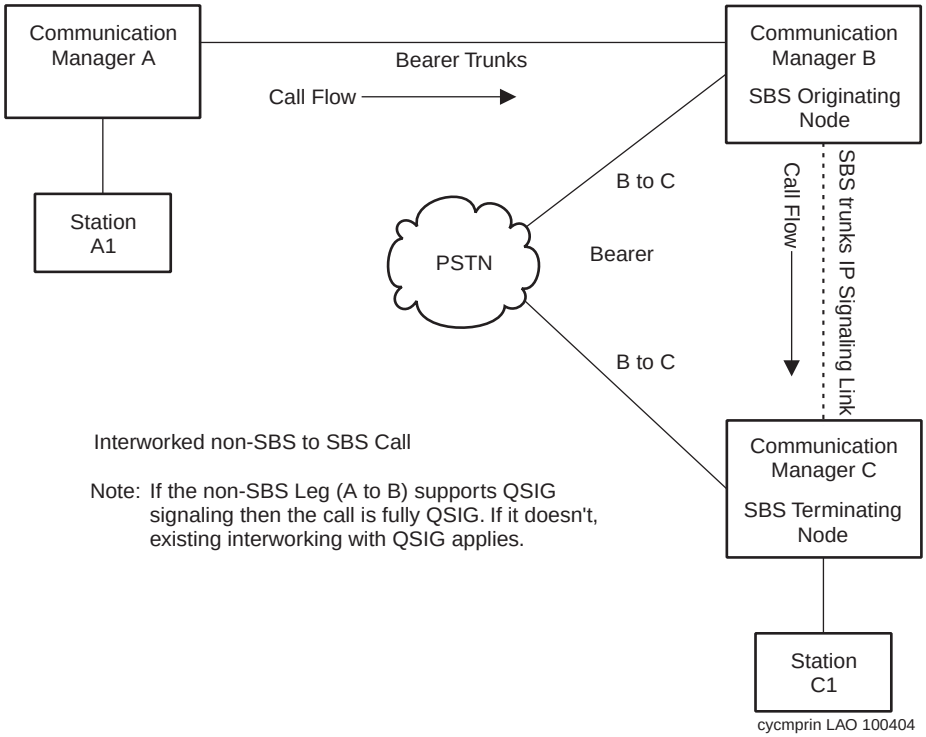


Figure 4: PRI Non-SBS to SBS Call Connections



Typical Call Setup

Following is a step-by-step description of a typical call.

1. An originating node user goes off hook and dials a terminating node user. They may dial whatever number of digits are required to reach the terminating user. The originating call may be routed using Uniform Dial Plan (UDP), Automatic Route Selection (ARS), Automatic Alternate Routing (AAR), or a combination of these steering mechanisms.

   Note:

   The call may first route over a non-SBS trunk to an SBS Interworking Node that then routes the call to an SBS trunk. In this case, the SBS Interworking Node (not the originating Node) serves as the SBS Originating Node for this call.

2. Whichever routing mechanism is invoked (UDP/ARS/AAR) the call is eventually routed to an H.323 IP trunk group translated to use QSIG signaling and specified in administration as an SBS trunk group with a SBS signaling group. This is the signaling portion of the call and will be active for the duration of the call. The SBS trunk group is identified by a new translation field as being reserved for SBS use. The signaling group associated with the SBS trunk group also has specific SBS translation. Other than these new fields the SBS trunk group and signaling group are translated as a standard IP trunk group with standard QSIG signaling.
3. The SBS Terminating Node receives the signaling call and, because it arrives on an SBS trunk group, knows it is an SBS call. The SBS Terminating Node determines that the called party in the signaling call SETUP message routes to a local extension or a non-SBS trunk and temporarily refrains from terminating the call to it. The SBS Terminating Node selects (allocates) a SBS Extension to use for the duration of call setup. SBS Extension is a new type of Administered Without Hardware extension that is administered at all nodes that will terminate SBS calls.
4. The SBS Terminating Node checks the *isdn public/unknown numbering* table and, finding a match for the SBS Extension, maps it to a national (public network) Complete Number, including area/city code if applicable. The SBS Terminating Node also determines the local Country Code from the *system-parameters features* administration form and pre-pends it to the number created from *isdn public/unknown numbering.* The resulting number includes Country Code/Area/City/SBS Extension.
5. The SBS Terminating Node then sends the Complete Number to the SBS Originating Node on the SBS Signaling call. This is the number that the SBS Originating Node will use to route the bearer call.
6. The SBS Originating Node receives the Complete Number and compares the Country Code received to the Country Code that the SBS Originating Node is located in. If the Country Codes are the same, it deletes the Country Code from the received number. If the Country Codes are different, the SBS Originating Node pre-pends its SBS International Access Code (from *system-parameters features*) to the received number.

7. The SBS Originating Node uses ARS to route on the (possibly modified) Complete Number. It then launches the SBS bearer call to the routed-to bearer trunk.
8. The SBS Originating Node associates the signaling and bearer calls internally.
9. The bearer call arrives at the SBS Terminating Node. The SBS Terminating Node determines that the call is for an SBS Extension and *immediately answers* the call.
10. The SBS Terminating Node then sends a message to the SBS Originating Node on the signaling call that contains a unique ID. This ID is three digits in length and is not administered in the SBS Terminating Node but is created, by the SBS Terminating Node, from the internal call id. This unique ID is reserved for the duration of the call. The unique ID will be used to help the SBS Terminating Node determine which bearer call is associated with the SBS signaling call in the event of multiple simultaneous calls to the SBS extension at the SBS Terminating Node. Multiple simultaneous calls to the SBS extension could happen due to misdirected PSTN calls, telemarketing calls, etc.
11. The SBS Originating Node then sends the unique ID via DTMF tones, on the bearer call, towards the SBS Terminating Node. The originating user does not hear the DTMF tones.
12. After receiving the unique ID the SBS Terminating Node associates the proper bearer and signaling calls and completes the call to the original destination (local extension or non-SBS trunk).
13. The SBS Terminating Node releases the SBS Extension.
14. When the called party is ringing, the SBS Terminating Node sends an ALERTING message to the SBS Originating node on the SBS signaling call.
15. When the called party answers, the SBS Terminating Node sends a CONNECT message to the SBS Originating Node on the SBS signaling call.
16. When either the calling party at the originating node or the called party at the terminating node hang up, both the bearer and signaling call are idled.

Tandem SBS calls

Separation of bearer and signaling calls may be tandemed through Communication Manager systems. Either the SBS signaling call or the SBS bearer call may tandem.

When SBS calls tandem through a intervening system it will not be possible to use status commands to determine what bearer call is associated with what signaling call. SBS signaling and bearer calls cannot be associated at tandem nodes.

Tandem SBS bearer call

While the SBS feature is intended to use the Public Switched Telephone Network (PSTN) for transport of the bearer call there is nothing to preclude the use of private point to point (Tie Trunk) facilities to establish the bearer call. The SBS bearer call may also use traditional H.323 IP trunks. When IP trunks are used for transport of the SBS bearer call, appropriate user expectations as to voice quality need to be set.

When private point to point facilities are used to transport the SBS bearer call, all feature transparency and name information will be obtained from the associated SBS signaling call. This is true even if the bearer call is transported on facilities capable of providing feature transparency (PRI).

Appropriate steering of extension numbers at intervening nodes must be administered to insure proper routing of tandem bearer calls.

Tandem SBS signaling call

SBS signaling calls may tandem through intervening nodes but those nodes must be Communication Manager systems, equipped with release 1.3 or later. Unlike SBS bearer calls, tandem SBS signaling calls must be carried on SBS trunks for all segments of the call. See Tandem SBS Call Connections on page 3.

Appropriate steering of extension numbers at intervening nodes must be administered to insure proper routing of tandem signaling calls.

Interworked SBS calls

The SBS Interworking Node is the switch where either an incoming SBS trunk call is routed to a non-SBS trunk SBS to non-SBS QSIG Call Connections on page 4, or an incoming non-SBS trunk call is routed to an SBS trunk PRI Non-SBS to SBS Call Connections on page 4. At the SBS Interworking Node, the Communication Manager will be either the SBS Originating Node or the SBS Terminating Node. The SBS Interworking Node will be the SBS Originating Node when a non-SBS trunk is interworked to an SBS trunk. The SBS Interworking Node will be the SBS Terminating Node when an SBS trunk is interworked to a non-SBS trunk.

Feature interworking on SBS calls is supported only to the degree that Communication Manager currently interworks public/private protocols to/from QSIG signaling.

Capacities

Capacity limits, regarding the SBS feature, apply to the number of SBS trunks and SBS extensions allowed. See Capacities on page 8 for capacity information.

Table 1: Capacities

Server	SBS Signaling Trunks	SBS Extensions
S8100 Media Server	100	50
S8300 Media Server	100	50
S8500 Media Server	1000	500
S8700 Media Server	1000	500
All other DEFINITY Media Servers	100	50

Prerequisites

Release 1.3 or later of Avaya Communication Manager is required on all nodes, originating and terminating, that participate in SBS calls.

Right To Use

These features are activated via a license file. Contact your Avaya sales representative or authorized Avaya reseller for information about how to purchase the necessary options.

Separation of Bearer and Signaling requires the availability of the following features which may be verified on the *display system-parameters customer-options* form:

- Page 1 Optional Features
  - Maximum Administered IP Trunks (Needs to be set greater than 1 and include enough trunks for SBS trunk group use)
- Page 3 Optional Features
  - IP Trunks? (Set to **y**)
- Page 7 QSIG Optional Features
  - Basic Call Setup? (Set to **y**)
  - Basic Supplementary Services (Set to **y**)

Note:

Other QSIG options may need to be activated, depending on the feature functionality requirements of the customer.

SBS Extensions will count against the pool of available ports in the same manner as Administered Without Hardware (AWOH) extensions.

SBS trunk group members count against the pool of available IP trunks.

SBS bearer calls will usually use the same trunks as normal local and/or toll PSTN calls. If SBS is being added to an existing system, consideration should be given to whether or not SBS will increase traffic on these PSTN trunks. Implementation of the SBS feature may require that the quantity of trunks to the PSTN be increased.

Offer Category

The SBS feature is available in both Offer Category A and B. Offer Category B (BCS and GuestWorks) only includes QSIG Basic Call with Name.

Hardware Required

The SBS feature requires the C-LAN board (TN799DP) or the appropriate Ethernet interface to support SBS Signaling calls over SBS H.323 trunks.

Trunk interface hardware will be required to support the chosen network connections to transport the SBS bearer calls. An SBS bearer call can be routed to any trunk interface appropriate for outgoing traffic, except it cannot route over an SBS trunk. If an SBS bearer call is routed over an IP trunk it will require Media Processor resources.

When ISDN-BRI trunks are used to provide SBS bearer call legs, the ability to send end-to-end signaling on the BRI trunk is required. This requires a minimum vintage of a TN2185B for the TE (user) side of the interface and a minimum vintage of a TN556D for the NT (network) side.

Caveats and Cautions

Calling Party—Delay in Call Setup Time

When originating an SBS call, the calling party may perceive a delay in call setup time compared to non-separated calls. The delay will be caused by several factors. The SBS bearer call cannot be initiated until after the SBS signaling call has been initiated and a number to route the SBS bearer call to has been received from the SBS Terminating Node. Then, depending upon the type of bearer trunk selected and its trunk signaling protocol, the establishment of this SBS bearer call may be noticeably delayed relative to a non-SBS call. Finally, the need to send DTMF digits over the SBS bearer call, so that the SBS Terminating Node can identify the correct bearer call, will also add delay.

The exact amount of these delays depends upon several variables such as the amount of congestion in the IP network used for the SBS signaling call and the type of bearer trunk used for the SBS bearer call.

Given a fairly un-congested data network, SBS calls add approximately 1.5 seconds to the call setup time as perceived by the originating user. This delay is relative to a non-separated call over the same type of trunk as used for the SBS bearer call.

The time before the originator hears audible ringback may approach 10 seconds for a bearer trunk that is slow to outpulse digits (rotary). However, a non-separated call using the same bearer trunk would result in a delay of approximately 8.5 seconds before audible ringback is heard. Some bearer trunks can outpulse digits quickly. An example is message oriented signaling trunks is ISDN. For these types of bearers, the SBS induced delay is a majority of the overall delay until the originator hears audible ringback. SBS delay of approximately 1.5 seconds still does not affect the originating user in any profound way.

The *called* party will perceive no delays relative to non-separated calls. All setup, validation, and association of SBS signaling and bearer calls will occur prior to alerting of the called party.

Feature Information Displays

Display feature information such as Name and Number, call transfer or forward indication and transfer-to or forward-to party information is the same for SBS calls as is currently provided for QSIG calls.

Note:

SBS call displays are driven exclusively by translations and signaling on the SBS trunk, and not by translations/signaling on the associated bearer trunk.

Administration Sequence

Separation of Bearer and Signaling is implemented using a combination of existing Communication Manager features/administration and new SBS related administration.

The following feature administration is required to implement this feature.

- The Local Country Code and International Access Code are administered at both the SBS Originating and SBS Terminating Nodes via new fields added to the *system-parameters features* screens.
- H.323 IP trunks, equipped with QSIG signaling, between nodes. These trunks will be used as the signaling portion of SBS calls and will be specifically translated as SBS trunks in their trunk group and signaling group administration forms. The number of SBS trunk group members must be engineered for the expected SBS traffic volume.
- Trunks to the local PSTN from each node. These trunks do not have any new SBS related administration.

  Note:

  While these trunks are intended to be circuit switched PSTN trunks, there is nothing in the SBS feature operation that precludes the use of other trunks. For example, a second choice for bearer calls may be IP trunks. If other than PSTN quality circuit switched trunks are used, realistic expectations as to voice quality must be established.

- AAR/ARS/UDP routing at each node. Calls to nodes using SBS trunking are initially steered to the SBS trunk group for the target (terminating) node. When the SBS Terminating Node returns a complete number to the SBS Originating Node *the bearer call will be established using ARS* and will be transported over standard bearer facilities (not the SBS trunk group). The bearer call will *always* be originated via ARS but the complete number may be modified and passed to other routing capability (AAR or UDP) and sent via private facilities.
- SBS Extensions. A new extension type that are translated at each SBS Terminating Node. Each SBS Extension must be Direct Inward Dial/Direct Dial In (DID/DDI) accessible at the SBS Terminating Node it is administered on. However, if the bearer call arrives at the SBS Terminating Node via other than PSTN DID/DDI trunks, for example private Tie Trunks, the SBS feature does not require that the SBS Terminating Node have physical DID/DDI trunks. Sufficient SBS Extensions must be allocated for the expected SBS traffic volume.

  Note:

  SBS Extensions are only in use for the duration of call setup, not for the entire duration of the SBS call.

- The *isdn public-unknown numbering* administration form is administered, at each SBS Terminating Node, to map SBS Extensions to a complete number, i.e. area/city/SBS extension. This complete number is then sent to the SBS Originating Node where ARS is used to establish the bearer call.

Basic Administration Screens

Only fields and field values relevant to the Separation and Bearer Signaling feature are discussed in the following sections. Some Communication Manager screens included here do not have new fields or field values but are included to help the reader understand the basic pre-requisites for the SBS feature. For complete descriptions of all fields and field values refer to *Avaya Administrator's Guide for Communication Manager*, which can be found in the *Avaya DEFINITY Servers and Avaya S8100 Media Server* Library.

change dialplan analysis

Note:

There are no new fields or field values for the *dialplan analysis* form associated with SBS.

This form is used to define the dial plan on the local system. In the example below the first digit of 2, 3, 6 and 7 are defined as extensions of various lengths (1 digit through 7 digits). SBS Extensions for this system are 6-digit extension numbers. See Station xxxxxx on page 21.

Figure 5: Dial Plan Analysis

```
display dialplan analysis                                    Page   1 of   3
                           DIAL PLAN ANALYSIS TABLE
                                                          Percent Full:    6

      Dialed  Total  Call       Dialed  Total  Call       Dialed  Total  Call
      String  Length Type       String  Length Type       String  Length Type
        00      2    attd         6       6    ext          #       2    fac
        01      4    fac          7       5    ext
        1       3    dac          8       1    fac
        2       1    ext          9       4    fac
        2       2    ext          9       5    ext
        2       3    ext          *0      2    fac
        2       4    ext          *1      2    fac
        2       5    ext          *2      2    fac
        2       6    ext          *3      2    fac
        2       7    ext          *4
2    fac
        32      7    ext          *5      2    fac
        37      7    ext          *6      2    fac
        39      7    ext          *7      2    fac
        4       1    fac          *8      2    fac
        6       5    ext          *9      2    fac
```

change route-pattern nn

Note:

There are no new field(s) or field values for the *change route-pattern* form associated with SBS.

- *TSC* - Set to **y** when centralized voice messaging is implemented in the network. This field must be set to *y* on the route pattern that SBS signaling calls are directed to. If this is not done, Message Waiting Indication (MWI) messages will fail and the voice messaging system will not able to light or retire message waiting lamps on individual stations.

Figure 6: SBS trunk group route-pattern

```
display route-pattern 52                                        Page   1 of   3
                           Pattern Number: 52

    Grp FRL NPA Pfx Hop Toll No.  Inserted                            DCS/ IXC
    No          Mrk Lmt List Del  Digits                              QSIG
                             Dgts                                     Intw
 1: 52   0                                                            n   user
 2:                                                                   n   user
 3:                                                                   n   user
 4:                                                                   n   user
 5:                                                                   n   user
 6:                                                                   n   user

     BCC VALUE  TSC CA-TSC    ITC BCIE Service/Feature BAND  No. Numbering LAR
    0 1 2 3 4 W     Request                                   Dgts Format
                                                           Subaddress
 1: y y y y y n  y  none      rest                                      none
 2: y y y y y n  n            rest                                      none
 3: y y y y y n  n            rest                                      none
 4: y y y y y n  n            rest                                      none
 5: y y y y y n  n            rest                                      none
 6: y y y y y n  n            rest                                      none
```

change isdn public-unknown-numbering

Note:

There are no new field(s) or field values for the *isdn public-unknown-numbering* form associated with SBS.

This form is used by call processing to create a "complete number" for the SBS extension when this system is the SBS Terminating Node in an SBS call. When a SBS call is received, and routes to a local endpoint or non-SBS trunk, an SBS extension will be allocated for use during call setup. If, for example, the extension was 694102, call processing would index the *public-unknown-numbering* table for the best match to the extension using the *Ext Code* column. For the translations shown in Figure 7: ISDN public-unknown-numbering on page 14 the best match is the 6 digit entry for Extension Code 69. Call processing will take the associated CPN prefix entry (3034) and pre-pend it to the extension to make a Complete Number, 3034694102. Call processing will then pre-pend the local country code found on System-parameters features on page 15 to the number, 13034694102. This complete number is sent to the SBS Originating Node on the SBS trunk that is originating the call.

Note:

The Complete Number that is sent to the SBS Originating Node must be DID/DDI accessible at the SBS Terminating Node. The SBS Originating Node will use its international access code to dial the Complete Number if the local country code provided differs from the local country code of the SBS Originating Node. See System-parameters features on page 15.

Figure 7: ISDN public-unknown-numbering

```
display isdn public-unknown-numbering                                  Page   1 of   8
                     ISDN NUMBERING - PUBLIC/UNKNOWN FORMAT
                                    Total                                      Total
Ext Ext    Trk       CPN             CPN Ext Ext    Trk       CPN              CPN
Len Code   Grp(s)    Prefix          Len Len Code   Grp(s)    Prefix           Len

 5  9                30337           10
 6  6                3033            10
 6  69               3034            10
```

New Administration Fields and Commands

System-Parameters-Features

This form must be administered before the SBS trunk group(s) are administered.

change system-parameters features

- *Local Country Code.* Specifies the country code for this node. Three numeric characters in length, this field defaults to **blank**. Example, in the United States this field would be populated with one (1).
- *International Access Code*. Specifies the access code required by the Public Switched Telephone Network (PSTN) to route calls out of the country. Five numeric characters in length, this field defaults to **blank**. This access code will be pre-pended to the number received from the SBS Terminating Node if that number indicates that the SBS Terminating Node is in a different country than the SBS Originating Node (i.e., if the Local Country Codes of the SBS Originating and SBS Terminating nodes are different). Example, in the United States this access code is 011.

  Note:

  Once administered, these system-parameters field cannot be cleared until all administered SBS trunk groups are removed.

Figure 8: System-parameters features

```
change system-parameters features                              Page   8 of  12
                        FEATURE-RELATED SYSTEM PARAMETERS

CPN/ANI/ICLID PARAMETERS

   CPN/ANI/ICLID Replacement for Restricted Calls:
  CPN/ANI/ICLID Replacement for Unavailable Calls:

INTERNATIONAL CALLING ROUTING PARAMETERS

               Local Country Code: 1
        International Access Code: 011
```

Trunk Group—SBS Signaling

add trunk-group n (page 1)

- Group Type. Always set to ISDN.
- Carrier Medium. Always set to IP.
- Dial Access. Always set to n.
- Supplementary Service Protocol. Always set to b.

Note:

The SBS trunk group will be added in three steps. First the trunk group will be created and the first two administration screens will be populated. Then the SBS signaling group will be created. See Signaling Group on page 18. Finally the trunk members will be added to the SBS trunk group. See change trunk-group n (page 6 - 22) on page 19.

Figure 9: Trunk-group—SBS signaling (page 1)

```
add trunk-group 52                                          Page   1 of  22
                                TRUNK GROUP

Group Number: 52                    Group Type: isdn           CDR Reports: y
  Group Name: HC tg 52 tf FIDO SBS        COR: 1        TN: 1        TAC: 152
   Direction: two-way        Outgoing Display? y          Carrier Medium: IP
 Dial Access? n                Busy Threshold: 255         Night Service:
Queue Length: 0
Service Type: tie                    Auth Code? n            TestCall ITC: rest
                          Far End Test Line No:
TestCall BCC: 4
TRUNK PARAMETERS
         Codeset to Send Display: 6     Codeset to Send National IEs: 6
        Max Message Size to Send: 260   Charge Advice: none
  Supplementary Service Protocol: b     Digit Handling (in/out): enbloc/enbloc

            Trunk Hunt: cyclical                    QSIG Value-Added? n
                                                  Digital Loss Group: 18
Calling Number - Delete:     Insert:                  Numbering Format:
              Bit Rate: 1200         Synchronization: async    Duplex: full
 Disconnect Supervision - In? y  Out? n
 Answer Supervision Timeout: 0
```

add trunk-group n (page 2)

- *SBS*. Always set to **y**. This new field defaults to **n**.
- *NCA-TSC Trunk Member*. Set to one member of the SBS trunk group.
- *Send Name*. Set to **y**.
- *Send Calling Number.* Set to **y**.
- *Send Connected Number*. Set to **y**.

Note:

The **SBS** field can only be set to **y** if the **Carrier Medium** field is set to **IP**, **Dial Access** is set **n**, and the **Supplementary Services Protocol** is set to **b** on Page 1. Also, the **Local Country Code** and **International Access Code** must be administered on the **system-parameters features** form.

The **Send Name, Send Calling Number,** and **Send Connected Number** fields are set to **y** for the SBS trunk group to enable these capabilities on SBS calls.

Figure 10: Trunk-group (page 2)

```
add trunk-group 52                                          Page   2 of  22
TRUNK FEATURES
          ACA Assignment? n            Measured: none      Wideband Support? n
                                 Internal Alert? n        Maintenance Tests? y
                               Data Restriction? n     NCA-TSC Trunk Member: 5
                                      Send Name: y      Send Calling Number: y
            Used for DCS? n              Hop Dgt? n
   Suppress # Outpulsing? n    Numbering Format: public
 Outgoing Channel ID Encoding: preferred     UUI IE Treatment: service-provider

                                              Replace Restricted Numbers? n
                                             Replace Unavailable Numbers? n
                                                  Send Connected Number: y

             Send UUI IE? y
               Send UCID? n
 Send Codeset 6/7 LAI IE? y

 Path Replacement with Retention? n
 Path Replacement Method: better-route
                     SBS? y  Network (Japan) Needs Connect Before Disconnect? n
```

Signaling Group

add signaling-group n (page 1)

- Group Type set to h.323
- Max number of NCA TSC set to greater than zero. Non Call Associated Temporary Signaling connections are used to establish connections and pass messages for features like Message Waiting Indication (MWI) activation and deactivation. QSIG protocol establishes and releases the NCA TSC for each MWI session.

  When a TSC is established between two Communication Manager systems it will send the message it was established for and then stay up until there have been a few minutes of inactivity. Depending on traffic this TSC may be used for multiple messages.

  When a TSC is established between a Communication Manager system and a messaging system it will be taken down after the initial message is sent.
- SBS set to y. (This field only appears when the Group Type is set to H.323.)
- Trunk Group for NCA TSC. Set equal to the SBS trunk group.
- Trunk Group for Channel Selection. Set equal to the SBS trunk group.
- Supplementary Service Protocol. Always set to b.
- Near-end /Far-end Listen Ports. The near-end value on this switch must match the far-end value on the distant switch. The near-end value on the distant switch must match the far-end value on this switch.

  Note:

  A signaling group that is used for SBS trunks cannot be used for non-SBS trunk groups. The **Near** and **Far-end Node Names** are defined using the **change node-names ip** administration form.

Figure 11: Signaling-group

```
add signaling-group 52
                                SIGNALING GROUP

 Group Number: 52              Group Type: h.323
                            Remote Office? n          Max number of NCA TSC: 5
                                      SBS? y           Max number of CA TSC: 0
                                                    Trunk Group for NCA TSC: 52
       Trunk Group for Channel Selection: 52
          Supplementary Service Protocol: b


        Near-end Node Name: hc_clan3         Far-end Node Name: fido_clan1
      Near-end Listen Port: 6067           Far-end Listen Port: 6067
                                        Far-end Network Region:
              LRQ Required? n            Calls Share IP Signaling Connection? y
              RRQ Required? n
                                             Bypass If IP Threshold Exceeded? n

             DTMF over IP: out-of-band        Direct IP-IP Audio Connections? y
                                                        IP Audio Hairpinning? y
                                             Interworking Message: PROGress


Command:
```

change trunk-group n (page 6 - 22)

- Trunk Group members added with a unique signaling group used for SBS signaling.

  Note:

  A signaling group cannot be used for both SBS and non-SBS trunk groups. A SBS trunk group cannot be associated with a signaling group that is connected to a Remote Office.

Figure 12: Trunk-group (page 6)

```
change trunk-group 52                                        Page   6 of  22
                                TRUNK GROUP
                                     Administered Members (min/max):   1/5
GROUP MEMBER ASSIGNMENTS                 Total Administered Members:   5

       Port    Code Sfx Name        Night           Sig Grp
  1:   ip                                            52
  2:   ip                                            52
  3:   ip                                            52
  4:   ip                                            52
  5:   ip                                            52
  6:
  7:
  8:
  9:
 10:
 11:
 12:
 13:
 14:
 15:
```

Note:

Like standard IP trunks the initial input for the *Port* field should be *IP.* Once the form has been successfully submitted the actual port information will be shown.

SBS Extensions

The SBS Extension type emulates a station with three call appearances. SBS Extensions cannot be assigned a coverage path or station hunting.

add station xxxxxxx

Where ***xxxxxxx*** is a valid extension that is DID/DDI accessible.

- **Type**. Always set to **sbs**.
- **Port**. Set automatically to **X** when **Type** is set to **SBS**.
- **Name**. Free form field.
- **TN**. Tenant Number. SBS Extensions may be partitioned via the Tenant Partitioning feature.

- **COR**. Class of Restriction.
- **COS**. Class of Service.

Figure 13: Station xxxxxx

```
add station 694102
                                    STATION

Extension: 694102                                                  BCC: 0
     Type: SBS                                                      TN: 1
     Port: X                                                       COR: 1
     Name: SBS TEST EXTENSION                                      COS: 1


Command:
```

Note:

SBS extensions should not be entered in fields, on other administration forms, where Communication Manager administration expects an extension since it is not a real extension. If this is done calls to the SBS extension will fail. Also, such non-SBS usage could disrupt completion of incoming SBS calls (i.e., if an SBS Extension was not available when needed due to misuse). Examples of fields where an SBS Extension should not be administered include (This list is not exhaustive):

- Hunt group member
- Point in a coverage path
- Cover Answer Group member
- Termination Extension Group member
- Hunt-to extension in Station Hunting
- Extension tracked by a Facility Busy Indicator button

List Station Type

list station type sbs

This command is modified to add a type of sbs to facilitate finding assigned SBS extensions.

Figure 14: list station type SBS

```
list station type SBS                                                   Page   1

                                  STATIONS

         Port/    Name/                          Room/         Cv1/ COR/    Cable/
Ext      Type     Hunt-to                Move    Data Ext      Cv2  COS     Jack

694101   X        SBS EXTENSION                                     1
         SBS                             no                         1
694102   X        SBS EXTENSION                                     1
         SBS                             no                         1
694103   X        SBS EXTENSION                                     1
         SBS                             no                         1
694105   X        SBS EXTENSION                                     1
         SBS                             no                         1
694106   X        SBS EXTENSION                                     1
         SBS                             no                         1
694107   X        SBS EXTENSION                                     1
         SBS                             no                         1
694108   X        SBS EXTENSION                                     1
         SBS                             no                         1

                press CANCEL to quit --  press NEXT PAGE to continue
```

Display Capacities

display capacities

Page 7

- **SBS Trunks (included in "Trunk Ports")**. This new field displays the Used, Available and System Limits for SBS Trunks.

  Note:

  The limit for the S8700 Media Server and the DEFINITY R server is 1000 SBS trunks. All other media servers are limited to 100 SBS trunks. SBS trunks count against the system maximums for the following:

- customer-options form, page 1 "Maximum Ports" field
- capacity form, page 6, "Trunk Ports" field
- capacity form, page 7, "IP Trunks" field
- capacity form, page 8, "Station and Trunk Ports" field

Figure 15: Display capacity (page 7)

```
display capacity                                                  Page   7 of  10
                                   SYSTEM CAPACITY

                                                                       System
                                                         Used Available  Limit
                                                        -----------------------

                  VOICE TERMINALS
                     Station Button Memory (units):        2 %    98 %  17496000
                                   Station Records:     1488   34487*    36000
                  Stations (includes BRI stations):      774      -        -
                                Stations With Port:      734
                             Stations Without Port:       40
                                    Other Stations:      714      -        -
                                         TTI Ports:        0      -        -
                               Auto Moves Stations:        0    5000      5000
                        Administered IP SoftPhones:       48    2752      2800
                 ISDN BRI Endpoint And Trunk Ports:       53    6947      7000
             IP Trunks (included in 'Trunk ports'):       98     902      1000
  Remote Office Trunks (included in 'Trunk ports'):        0    1000      1000
            SBS Trunks (included in 'Trunk ports'):        5     995      1000
       '*'  Availability reduced by the number of administered VDNs
```

Page 8

- **SBS Stations** This new field displays the Used, Available and System Limit for SBS stations.

  Note:

  The limit for the S8700 Media Server and the DEFINITY R server is 500. All other media servers are limited to 50 SBS stations. SBS Stations count against the system maximums for the following:

  - customer-options form, page 1 "Maximum Ports" field
  - capacity form, page 4, "Extensions" field
  - capacity form, page 7, "Stations Records" field
  - capacity form, page 7, "Stations without ports" field
  - capacity form, page 8, "Station and Trunk Ports" field

Figure 16: Display Capacity (page 8)

```
display capacity                                                Page   8 of  10
                                SYSTEM CAPACITY

                 TOTAL SUBSCRIBED PORTS
                                                                      System
                                                      Used Available  Limit
                                                     -----------------------
                           Station and Trunk Ports:   1134   18866    20000
                                      SBS Stations:      9     491      500
                                 Radio Controllers:      0       0        0
                                Wireless Terminals:      0       0        0
                                  XMOBILE Stations:      0       0        0
                                             EC500:      0
                                              DECT:      0
                                               PHS:      0
        SYSTEM-WIDE REGISTRATION COUNTS
                                               Currently              System
                                               Registered  Available  Limit
                                               -----------------------------
                                IP Stations:       489       4511      5000
                      IP Attendant Consoles:         0          1         1
                     Remote Office Stations:         0       1000      1000
```

Maintenance

Media Processor resources

SBS trunks will not carry the bearer portion of a SBS call, and thus do not require Media Processor (VoIP Engine) resources. They will have different maintenance behavior than "regular" H.323 IP trunk groups. For example, they can be brought into service as soon as the associated signaling group is in service.

SBS Trunk Group - Signaling Group

Each SBS signaling trunk group will require that a signaling group be assigned. This signaling group will be specified as an SBS signaling group via a new field on the signaling group translation form. See Signaling-group on page 19.

Communication Manager administrators may define system-wide acceptable limits of round-trip delay and packet loss on the **system-parameters maintenance** form **IP** page. H.323 signaling groups have a field, "Bypass if IP thresholds exceeded?" (change signaling-group). If the signaling group bypass field is set to "yes", and if the IP thresholds are exceeded, the signaling group and its associated IP trunks are placed in maintenance bypass mode. This means that idle trunks are taken out of service and are thus unavailable for new outgoing calls. Active trunks are taken out of service *after* the existing call drops.

Since IP network congestion can be one source of delay in establishing SBS calls, Communication Manager administrators could consider utilizing this "bypass" mechanism to ensure acceptable SBS feature operation. However, in taking this action, it should be considered that the system-wide packet delay/loss parameters are typically administered to ensure proper voice quality, and thus may be more restrictive than necessary for signaling-only calls. In other words, **Bypass could cause SBS trunks to be taken out of service unnecessarily.** This would be when delays are disruptive to voice quality, but not severe enough to have a noticeable impact on the overall SBS call setup delay. The system-wide parameter settings for packet loss and delay should be carefully considered before implementing Bypass on SBS signaling groups.

Also, Media Processor resources are used to perform the periodic background tests that drive the Bypass capability. If there are no Media Processor resources available, which is possible because SBS trunks do not require media processor resources, the Bypass test will not execute and no Bypass will occur.

Signaling Group Maintenance

Existing H.323 signaling group maintenance is performed on SBS signaling groups. To detect signaling group failures, if a TCP signaling connection cannot be established to the far-end for originating a new call, maintenance is notified to run the appropriate signaling group tests. Once maintenance drives the faulty signaling group out of service, subsequent calls will not be attempted on the associated signaling trunk group, as usual. However, maintenance may not be immediate in placing the faulty SBS signaling group out of service. During this variable time interval, all outgoing call attempts using this signaling group, including the first call that detected the fault, will be internally rejected with a Look Ahead Routing (LAR) triggering Cause Value. If LAR is enabled on the appropriate route-pattern preference for this SBS trunk group, alternate preferences will be attempted, until the trunk group is finally taken out of service.

SBS Trunk Service States

SBS trunk group members will achieve "in service" status without requiring any associated Media Processor circuit packs to be in service. All that is required for an SBS trunk group member to be "usable" for a call is that the associated signaling group reach an "in service" state.

When, for any reason, a SBS signaling group goes out of service the associated SBS trunk group members associated with that signaling group are taken out of service to avert failed call attempts. Reasons that a signaling group might be taken out of service include, busy out of the signaling group, or CLAN board removal or failure.

The status of Media Processor resources, if present, does not have any effect on SBS trunk group member service states.

Trunk Member Status

The **`status trunk`** ***`trunk group/member`*** command, when executed against a SBS trunk group member, is enhanced to show the associated bearer trunk port. A new field **Associated SBS port:** is added to convey this information.

Conversely, if the **`status trunk`** ***`trunk group/member`*** command is executed against a bearer trunk group member involved in a SBS call, the associated SBS trunk group member will be displayed.

SBS Extension Status

When the **`status station`** command is executed for an SBS Extension the results will be the same as for any Administered Without Hardware extension.

Note:

SBS Extensions will only be active for short periods of time during call setup.

Finding the parties Involved in an SBS Call

At an SBS Originating Node the parties involved in an SBS call can be determined via status commands, as shown in Parties Involved in an SBS Call on page 27.

At an SBS Terminating Node the parties involved in an SBS call can be determined in a similar fashion to that described for the SBS Originating Node by replacing the "originating" station/trunk with the "terminating" station/trunk, and replacing the "outgoing" bearer trunk with the "incoming" bearer trunk.

At an SBS Tandem Node executing "status trunk" on an SBS trunk member will show that the trunk is "in-service/active". However, the "Connected Ports" and "SBS Associated Port" fields will be blank. *This should not be misinterpreted as a hung trunk.* The associated bearer call will most likely route entirely through the PSTN. Even if the associated SBS bearer call routes through the SBS Tandem Node, that node will have no way of associating the SBS signaling and SBS bearer calls. Association of the signaling and bearer calls can only be accomplished at the SBS Originating and SBS Terminating Nodes.

Table 2: Parties Involved in an SBS Call

SBS Originating Node Command	Shows Connected Ports	Shows SBS Associated Port
status on originating station or incoming non-SBS trunk. status station n or status trunk-group/member	outgoing bearer trunk port	n/a
status on outgoing bearer trunk group *status trunk-group*	originating station or incoming non-SBS trunk	n/a
status on outgoing bearer trunk group member status trunk-group/member	originating station or incoming non-SBS trunk	outgoing SBS trunk port

1 of 2

Table 2: Parties Involved in an SBS Call (continued)

SBS Originating Node		
Command	**Shows Connected Ports**	**Shows SBS Associated Port**
status on outgoing SBS trunk group *status trunk-group*	originating station or incoming non-SBS trunk	n/a
status on outgoing SBS trunk group member *status trunk-group/member*	originating station or incoming non-SBS trunk	outgoing bearer trunk port
		2 of 2

Error Handling

Software errors and denial events are logged for the error conditions listed in Error Conditions on page 28. The tone treatment provided to the originating party is also shown along with whether or not Look Ahead Routing (LAR) will be attempted.

Table 3: Error Conditions

Error Condition	Cause Value	LAR or non-LAR	Tone Treatment	Software Error or Denial Event
SBS Orig. Node gets CALL PROC w/o Null Caps, or gets ALERT, PROG, or CONN before 2 INFO msgs, or gets INFO w/bad contents	95 (invalid msg)	non-LAR	intercept	denial event
SBS Term. Node gets bearer call to allocated SBS Extension, but wrong call	21 (call rejected)	non-LAR	reorder	error
SBS Term. Node has SBS Extensions administered but none available	47 (resource unavailable, unspecified)	LAR	reorder	denial event
				1 of 2

Table 3: Error Conditions (continued)

Error Condition	Cause Value	LAR or non-LAR	Tone Treatment	Software Error or Denial Event
SBS Term. Node has no SBS Extensions administered	69 (requested facility not implemented)	non-LAR	intercept	denial event
SBS Term. Node allocates SBS Extension but can't map it to National Complete Number	79 (service/ option not implemented, unspecified	non-LAR	intercept	denial event
SBS Term. Node gets incoming trunk call to non-allocated SBS ext.	21 (call rejected)	non-LAR	reorder	error
SBS Term. Node gets local endpoint call to SBS Extension (allocated or not)	N/A	N/A	intercept	error
SBS Term. Node gets incoming trunk call to SBS Extension that already has 2 trunk calls	21 (call rejected)	non-LAR	reorder	error
SBS Term. Node gets SETUP w/o Null Caps	95 (invalid msg)	non-LAR	intercept	denial event
Non-SBS trunk gets SETUP or CALL PROC with NULL CAPS	95 (invalid msg)	non-LAR	intercept	denial event
Percentage of SBS Extensions in use (allocated) exceeds 80%	N/A	N/A	N/A	event

2 of 2

System Resets

All reset levels act upon SBS trunk calls in the same manner they act on other types of trunk calls. A reset level 2 or higher causes any SBS trunk call to be dropped. The signaling and bearer portions of the SBS trunk call are dropped and all facilities associated with the SBS trunk call re-initialized. All administered SBS extensions are placed in the *available* state (to call processing) after a level 2 or higher reset.

A hot restart or a warm restart (reset level 1) will not affect existing stable SBS calls.

Upgrades

SBS calls are *not* preserved during an upgrade.

Duplication Interactions

Scheduled or demand processor and server interchanges have no impact on SBS calls.

Traffic Measurement

Traffic measurements for SBS calls and resources use existing measurements.

For SBS signaling and associated bearer trunk groups, use the **`list measurements trk-grp hourly/summary`** command for traffic measurements.

No new measurements are implemented for SBS Extensions. The usage of SBS Extensions is very transient. However, if a SBS Terminating Node is out of SBS Extensions to allocate, an error will be logged. Use the **`display errors`** command for the incoming SBS trunk group to display these errors.

Network Interfaces

SBS signaling is performed through the CLAN circuit pack.

Signaling types of bearer facilities

Virtually any outbound facility and signaling type will function as transport for the bearer leg of a SBS call. Signaling types include:

- ISDN signaling (PRI, BRI, and IP) including Call-by-call Service Selection trunk groups.
- Central Office (CO)
- E&M Tie
- Foreign Exchange (FX)
- Wide Area Telephone Service (WATS)
- Asynchronous Transfer Mode (ATM CES)

- 2MB digital trunk (Japan)
- Brazil E&M signaling trunks
- Hungary E&M signaling trunks
- S8300 Media Server - Media Modules (T1/E1 and analog trunk)

Network interface interactions

- DTMF ANI signaling on an incoming SBS bearer call could interfere with the SBS invoked DTMF signaling set to identify the correct bearer call. This service should not be subscribed to on trunk groups that may be used to deliver SBS bearer calls.
- Where a customer uses in-band call transfer capability from a network Service Provider (like Take back and Transfer) and they subscribe to a *notify* option, the incoming DTMF signals on an SBS bearer call will cause the SBS bearer call to fail. *This service should not be subscribed to on trunk groups that may be used to deliver SBS bearer calls.*
- If a customer subscribes to Alternate Destination Routing, they must take care to not include the SBS extension numbers in the DID/DDI blocks subject to reroute. If such alternate routing occurs, the incoming SBS bearer call cannot be associated with its SBS signaling call and will be dropped.
- Hong Kong DTMF Supplementary Services information *will not* be displayed to the endpoint user on an SBS call since the display contains information from the SBS signaling call.
- Macedonia E1 Support for PPM messages *will not* be displayed to the endpoint user when this type trunk is used as an SBS bearer because bearer trunk signaling does not impact user displays on SBS calls.
- Calling Party Number (CPN) information received on an SBS bearer call will be tandemed on the SBS bearer call but it will not be displayed to the endpoint user. It is available for Call Detail Recording (CDR) on the bearer call record.
- An analog station connected to a TN793/TN2793 port with Incoming Call ID will see the SBS signaling information when making or receiving an SBS call.
- US Analog Trunk & Line - TN797 - Supports SBS.
- Country specific functionality that does not require end user activation, acknowledgement, or display will be supported on SBS bearer calls. For example, China Disconnect on No-Answer will disconnect the bearer call and the SBS signaling call will also disconnect.
- Disconnect supervision for an SBS bearer call is provided/processed as usual for that type of bearer trunk. If no disconnect supervision is available on a trunk used for an SBS bearer call, then disconnect supervision will be provided by the SBS signaling call. *Dropping either the SBS bearer call or the SBS signaling call will drop the associated SBS signaling/ bearer call respectively.*

- For ISDN trunks, the Incoming Call Handling Table may be used to delete leading digits of the SBS bearer call's called number to direct the call to the indicated SBS Extension. *Digit manipulation must not modify the extension portion of the number, or the SBS bearer call will not terminate to the indicated SBS Extension and thus cannot be associated with its SBS signaling call.*
- For non-ISDN trunks or ISDN bearer trunks using overlap receiving, insertion/deletion may also be used to direct the SBS bearer call to the indicated SBS Extension. *Again, digit manipulation must not modify the extension portion of the number, or the SBS bearer call will not terminate to the indicated SBS Extension and thus cannot be associated with its SBS signaling call.*
- Where ANI is received on an incoming non-SBS call, and the call is tandemed to another Avaya Communication Manager using SBS, the received ANI information will be tandemed in the SBS signaling call to the far end per current QSIG interworking procedures. The network interfaces that may receive ANI and then tandem to a SBS call include:
  - Analog CO Trunk (TN429)
  - R2-MFC trunks
  - India MFC trunks
  - Integrated R2-MFC Signaling - DID/CO
  - MFE
  - MFC and Russia MF Multiple ANI
  - Spain MFE
- For the No Disconnect Supervision Trunk Operation, the SBS signaling call will control disconnect supervision for the associated bearer call.

Feature Interactions

Separation of Bearer and Signaling (SBS) provides a new type of trunk call (i.e. separated), and since numerous types of trunks can be used to carry the bearer portion of the separated call, this feature impacts many Avaya™ Communication Manager features. Almost any feature that can interact with a trunk call potentially interacts with SBS.

The following sections document features that could interact with SBS calls. While an attempt has been made to be exhaustive, this cannot be guaranteed.

A limited, high-level understanding of the way SBS calls will be configured internally is critical to understanding why certain features can work with SBS calls, and others cannot. This general understanding will also give the reader sufficient insight to fairly accurately predict whether or not a feature that is not discussed here (e.g., a new feature) can successfully work with an SBS call.

There are two important facts related to the internal configuration of an SBS call that must be understood:

- *The SBS Bearer and SBS Signaling calls will be tracked internally as separate calls for the life of the SBS call.* Separate call records will be created internally for each call. This is necessary to allow the SBS Bearer call to be carried over almost any type of trunk, utilizing the standard call establishment and tear down code for that trunk type. This would not be possible if the bearer trunk were somehow "buried" as a non-standard party in a "merged" signaling/bearer call record.
- *The endpoint users will be parties on the SBS Signaling call, not on the SBS bearer call.* Another way to look at this is *the SBS Signaling call will be the "controlling" call.* This is necessary to support QSIG functionality on SBS calls. Since endpoint user activity drives QSIG signaling only if a QSIG trunk is a party on the call, the SBS Signaling call must be the controlling call. A QSIG trunk is only guaranteed if the endpoint user is associated with the SBS trunk, not with the bearer trunk.

Given these two facts, the following general observations about feature interactions with SBS calls can be made.

- **Most features work with SBS:** A significant number of the features that can interact with an SBS call will simply work as they would with any other QSIG trunk call.
- **Delay applies to all SBS calls:** For features that do work with SBS calls, the standard SBS delay applies and is not specifically mentioned in the feature interaction sections that follow. See Calling Party—Delay in Call Setup Time on page 10.
- **Call status:** Any query or report related to an endpoint user on an SBS call will indicate the call ID of the SBS signaling call, and will indicate the trunk ID of the signaling (not the bearer) trunk. An example of this would be the **`status station x`** command. This command issued against a station on an SBS call would show the station connected to an SBS trunk.
- **Feature signaling interworks to/from SBS Signaling calls:** Any feature information that is interworked from a non-SBS leg of a call to an SBS leg of a call will be transported on the SBS signaling call, not on the SBS bearer call. Likewise, any feature information interworked from an SBS leg of a call to a non-SBS leg of a call will be taken from the SBS signaling call, not from the SBS bearer call.
- **Two records per SBS call:** Any feature that reports or records status for a call will potentially create two different reports or records for a single SBS call. One report or record for each leg (signaling and bearer) of the call. An example of this would be Call Detail Recording (CDR). Of course, in the case of CDR, this will depend on whether or not both trunks groups are administered to produce call detail records.
- **Bearer trunk signaling features will not work:** Features that require signaling over a non-QSIG type trunk will not work with SBS calls. The endpoint users will not be parties on the SBS Bearer call, and so user activity cannot drive any feature signaling on the bearer call. Similarly, any feature signaling that is received on the bearer call cannot drive any notification/displays to the endpoint user(s). For example, public or private network-specific (non-QSIG) Malicious Call Trace network notification and Advice of Charge Display functionality will not work with SBS calls.

- **Bearer trunk user features will not work:** Features related to the SBS Bearer call that require activation or acknowledgement from an endpoint user cannot work with SBS calls because the endpoint user is not a party on the bearer call. For example, queuing of the SBS Bearer call will not work because the real originating party is not on the bearer call.
- **Early answer features will not work:** Features that require early answer (e.g. to pass tones) will not work with SBS calls. This is because when the signaling call is answered the bearer call hasn't even been launched yet. When the bearer call is first answered it is for the SBS extension at the SBS Terminating Node. For example, authorization code collection on incoming calls and direct calls to remote access will not work with SBS calls.
- **Network features sending tones when the bearer call answers will not work:** When the bearer call is answered it is for the SBS extension. The final endpoint user is not on the call to hear the tones. An example would be the DTMF notification that a network call is eligible to be transferred, such as with Take-back and Transfer.

General System Feature Interactions

- Media Processor resources are not used by the SBS trunks which only carry SBS Signaling calls. SBS bearer calls will require media processor resources if IP trunks are used.

  Note:

  Voice quality degradation may be encountered if IP trunks are used for bearer calls.
- Shuffling and Hair-pinning will work with SBS Bearer calls if IP trunks are used. The SBS bearer call will be originated with the same "shufflable endpoint" characteristics as the real originator.
- The contents of the Incoming Call Identification display for an SBS call is obtained from the SBS Signaling call, not the Bearer call.
- The Class of Restriction (COR) of the SBS call originator is used to set up the SBS signaling and SBS bearer calls. This is true whether the originator is a station or an incoming trunk that tandems to a SBS call.
- The SBS signaling and bearer calls are routed separately. Caution must be exercised when applying Toll Restriction, Toll Analysis and Toll/Code restriction so as to not block calls that should be allowed.
- The Class of Service (COS) Trunk-to-Trunk Transfer permission will affect transfer of SBS trunk calls just like it currently affects transfer of non-SBS trunk calls.
- SBS calls will follow Station Hunting of the originally called party.
- SBS calls will follow Call Forwarding of the originally called party.
- SBS calls will follow Call Coverage of the originally called party.

- When tenant partitioning is active in an enterprise, existing Tenant Partitioning rules apply to endpoints, SBS Extensions, SBS trunk groups and the bearer trunk groups involved in any SBS call.
- SBS will work with Dial Plan Expansion (Six or seven digit stations).
- Standard Malicious Call Trace (MCT) on an incoming SBS call will record the bearer trunk call.

Attendant Related Items

Attendant features that will not work

- Attendant Control of Trunk Group Access will not work with an SBS Trunk Group since it is a QSIG trunk group.
- Centralized Attendant Service (CAS) will not work over SBS trunks since CAS requires the use of Release
- Trunks (RLT). However, an incoming SBS call can be directed to a centralized attendant over an RLT using CAS. Likewise, a Centralized Attendant can extend a call, over an RLT, that then routes to an SBS trunk.

Attendant features that will work

- Attendant Direct Extension Selection (DXS) may be used to originate an SBS call using Uniform Dial Plan (UDP). The attendant Busy Lamp Field (BLF) will only reflect the status of stations local to the attendant.
- Attendant Intrusion may be used to intrude on an SBS call.
- Attendant Recall will work with an SBS call
- Attendant Return Call and Serial Calling will work with an incoming SBS call.
- Attendant transfer is applicable to an SBS call.
- An incoming SBS call can be parked and is subject to Call Park Time-out to the Attendant.
- An SBS call may be a conference party in an Attendant conference.
- An SBS call may be directed to an Individual Attendant access number.
- Inter-PBX Attendant service will work with SBS trunks.
- Incoming SBS calls will follow Attendant Night Service
- Incoming SBS calls will hear Recorded Announcements in the Attendant Queue.
- An incoming SBS call can be answered using Trunk Answer Any Station (TAAS).
- The Trunk Identification by Attendant feature will identify the SBS trunk member.

- An SBS call can be held with Two-Party Hold on Console.
- Attendant Vectoring can receive and redirect Attendant directed calls over SBS trunks.

Adjunct Switch Applications Interface (ASAI)

ASAI Interactions

- When using Call Classification after Answer, calls should not be routed using SBS because the Call Classifier must be on the bearer trunk and there will be interference from the SBS invoked DTMF signaling sent on the bearer trunk.
- ASAI Phantom call, e.g. DEFINITY Anywhere, may originate or receive an SBS call.
- ASAI Selective Listening will work on an SBS trunk party on a call.
- ASAI Send DTMF will work on a *connected* SBS call.
- ASAI Single Step Conference can add another station onto a call with an SBS call.
- ASAI Provided Dial-Ahead Digits will work where the incoming call is an SBS call.
- Any ASAI user data and/or UCID that is currently transported or interworked over QSIG trunks will be sent on the SBS signaling call.
- When an SBS call is received and subsequently tandemed over an SBS trunk, any II Digits received in the incoming SBS Signaling call SETUP message will be tandemed with the SBS Signaling call.
- The information provided in response to an ASAI Value Query will indicate whether an SBS trunk or associated bearer trunk is idle or busy. The response will be reported based on the uid in the query message and whether it was for the signaling or bearer trunk.
- For ASAI Event Reports the Avaya Communication Manager will report the Call ID and Trunk ID of the SBS trunk. ASAI should provide the Trunk ID of the associated bearer trunk to the ASAI Event Reports and Adjunct Route message.

Voice Mail adjuncts (AUDIX, Intuity, Octel)

Interactions

- Centralized voice mail with Inter-switch Mode Codes does not interwork with SBS trunks. For that application, the tie trunks between the Communication Managers cannot use the QSIG protocol. While those trunks could be used for SBS bearer calls it is unlikely that when this methodology is implemented that SBS would also be implemented.
- QSIG LWC MSI supports Digital Line Emulation integration for Centralized Voice Mail using SBS.

- AUDIX Centralized Voice Mail is supported by SBS.
- Transfer into QSIG Centralized AUDIX from a Served User switch will work over SBS.
- Where a Serenade (Octel) is connected to a Communication Manager with QSIG, that Communication Manager will be the SBS Terminating Node interworking to the Serenade since the Serenade does not support SBS.

Call Detail Recording

CDR functionality records the Calling and Called number information and starting and ending time of each measured call. This is administrable on a trunk group basis within Avaya Communication Manager. At the end of a call, the information is made available to an adjunct server for various functions, i.e. costing, reports, traffic analysis.

In the case of an SBS call the data that is gathered and made available to the adjunct server will not change. However, since each trunk group involved in an SBS call can be administered for CDR Reports: y/n, there can be two CDR records for each SBS call. One record is generated for the SBS signaling call and one record is generated for the SBS bearer call. **There will be no way to link the separate SBS signaling and bearer CDR records.**

Since there is no way to link the signaling and bearer CDR records, it may be preferable to only measure the bearer call as they are most likely being billed for by a Service Provider. However, it must be noted that the SBS bearer call is always answered (by the SBS Extension) even though the real called party may not answer the SBS call. Also note that the parties on the SBS bearer call are not the actual originating and terminating parties (they are "dummy" users internal to Communication Manager for the sole purpose of originating and terminating the bearer call).

Call Management System (CMS/BCMS)

A trunk group, Vector Directory Number (VDN), and/or hunt group is administrable to be measured for CMS/Basic Call Management System (BCMS). An SBS call can potentially generate two separate CMS/BCMS records: one for the SBS signaling call and one for the SBS bearer call.

The SBS bearer call will only be measured if the bearer trunk group is administered to be measured, and the only events that will be measured on the bearer call will be the trunk (bearer) seize and idle.

The SBS call will be measured if either the SBS trunk group is administered to be measured, or if an endpoint on the SBS call is a measured object (e.g., an agent in a hunt group that is administered to be measured). The events that will be measured on the SBS signaling call will include not only the trunk (signaling) seized and idled events, but also any endpoint events (e.g., agent hold).

The SBS signaling and bearer calls will generate separate CMS/BCMS records with different Universal Call IDs. There will be no way to link these separate records.

Call Center Interactions

Automatic Call Distribution (ACD)

- Look Ahead Interflow may not function correctly on an SBS call due to the SBS call setup delay. If the SBS delays proved to be a problem, Best Service Routing (BSR) Polling using Non Call Associated (NCA) Temporary Signaling Connection (TSC) could be used instead.
- If Outbound Calling is being done from a Call Center, and the call is using SBS to call another Communication Manager system, the call will be affected by the normal SBS call setup delays. Outbound Calling over SBS trunks must not use Call Classification, since there will be interference from the SBS invoked DTMF signaling sent to identify the correct bearer call at the terminating end.
- Dialed Number Information Service (DNIS) and Original Dial Number Delivery service from a Service Provider can deliver an SBS bearer call to an SBS extension in an SBS Terminating Node.
- When an incoming ACD call arrives via an SBS trunk, transfers by an agent to another agent or to an application will work properly.
- An incoming SBS call will be able to hear any announcements associated with the Call Center.
- The agent "Assist" functionality will work when the incoming call arrives using SBS.
- Displays at the agent terminals will function correctly when the incoming call arrives over SBS. This includes Vector Collected digits.
- Multiple Call Handling will work when arriving calls are incoming SBS calls.
- An incoming SBS call receiving Redirect on No Answer (RONA) will work correctly.
- SBS calls receiving intra-flow, inter-flow or hunt group night service treatment will route as a non-SBS call would.
- Any ISDN and/or R2MFC call data (calling party number, II digits, CINFO digits, etc.) that are currently interworked to (from) a QSIG trunk will be sent on (retrieved from) the SBS Signaling call at the SBS Interworking Node.
- Call Center data that is currently transported on QSIG trunks will be sent on the SBS Signaling call.
- When an ACD call is transferred to an agent on another Communication Manager system via an SBS trunk connection, all associated call information currently transported on a QSIG trunk will be sent on the SBS signaling call
- All types of Service Observing will work on SBS calls as it does on non-SBS calls.

Best Service Routing

- Best Service Routing Polling can use SBS signaling facilities as long as the NCA-TSC version of BSR Polling is used and adequate resources are available. The older non-NCA-TSC, version of BSR Polling is not expected to work due to the SBS call setup delays.
- BSR interflow over SBS trunks (including incoming call data forwarding and Enhanced Information Forwarding) will be supported.

Vectors

- Routing on Automatic Number Identification (ANI) by a vector can use SBS to route an outgoing call. For an incoming SBS call, the Routing on ANI functionality will use the ANI from the SBS signaling call.
- Correct routing over SBS trunks will work when there is a vector step for routing on ANI or II digits or a route to number step and Inter-flow is invoked.
- Post-Connect in-band DTMF signaling for Call Prompting collect steps and Auto Attendant functionality will work.
- When CINFO Digit Routing occurs, and the call is routed over an SBS trunk, the information will be tandemed with the call.
- Vector Routing Tables may use SBS trunks for routing calls.
- Incoming SBS calls will still provide VDN or Origin (VOA) announcements and displays to the agent answering the call.
- VDN Return Destination will work with SBS calls.

Networking Related Interactions

Networking features or capabilities that will not work

- Authorization Codes cannot be collected on incoming SBS signaling or SBS bearer calls (e.g., when required through administration of the incoming trunk group or when required due to insufficient FRL on a tandem call). Authorization codes cannot be collected on incoming SBS signaling calls because the SBS bearer call has not yet been established at the time when an authorization code would normally be prompted for and signaled (inband). Also, authorization codes cannot be collected on incoming SBS bearer calls because the originating endpoint user is not a party on the SBS bearer call.
- When the bearer call is transported via Message Oriented Signaling trunks (ISDN) information in the SBS bearer call "D" channel will not be displayed to the end users as it is overridden by signaling in the SBS signaling call.

- User information is ignored when it is in the SBS bearer leg of the call.
- Australian Malicious Call Trace (MCT) can never be invoked on an SBS call. This is because end user activity drives feature signaling only on the SBS signaling call not on the SBS bearer call and an SBS trunk does not support the Australia public network protocol.

  Note:

  Normal Communication Manager MCT will record the call as usual, since this is an internal feature.
- ETSI MCT can not be invoked on an SBS call. This is because end user activity drives feature signaling only on the SBS signaling call not on the SBS bearer call and an SBS trunk does not support ETSI protocol.

  Note:

  Normal Communication Manager MCT will record the call as usual, since this is an internal feature.
- Calling Line ID Prefix information is ignored when transported in conjunction with an SBS bearer call.
- Advice of Charge information received on an SBS bearer call is not displayed to the end user. However, it is conveyed to the CDR port for the SBS bearer call record. Only SBS trunk information impacts end user displays.
- ETSI Network Call Deflection (NCD) will not work with an SBS call. For SBS, the signaling used to control the call is in the SBS signaling call on the QSIG interface while NCD requires an ETSI interface which is only available on SBS bearer calls.
- ETSI Network Call Transfer (NCT) will not work with an SBS call. For SBS, the signaling used to control the call is in the SBS Signaling call on a QSIG interface, while NCT requires an ETSI interface that is only available on the SBS bearer call.
- Direct SBS calling into Remote Access will not work. Barrier Codes cannot be collected for SBS calls to Remote Access because the SBS Bearer call has not yet been established when such tones are prompted for or expected (inband). However, an SBS call can invoke remote access through a vector "collect" or "route-to" step.
- Wideband Switching (NxDSO) is not supported by SBS.
- Russian Incoming ANI via button will not display the ANI received in the SBS bearer call (only ANI received on the SBS signaling call will be displayed to the end user).
- Trunk "Flash" to get recall dial tone from a Central Office will not work because end user activity drives signaling on the SBS signaling call only, not the SBS bearer call. QSIG Call Transfer functionality can be used instead.
- R2 MultiFrequency Compelled (MFC) Intercept treatment must drop the SBS bearer and SBS signaling calls and will do so by applying the appropriate treatment to the call originator, based on what is received on the R2 MFC bearer call.

Networking features or capabilities that will work

- Authorization codes can be collected when required on an outgoing SBS call (i.e. when required to access the SBS trunk), since they are collected locally prior to seizing of the outgoing trunk.
- Calling Party Number (CPN) restriction may be administered for and/or signaled on both the SBS signaling and SBS bearer calls. However, end user displays (including any restrictions) are populated from information carried in the SBS signaling call, not from information in the SBS bearer call.
- At an SBS Interworking Node, DCS/DCS+ signaling on the non-SBS leg of the call will be interworked to/from the SBS signaling call to the extent that DCS-QSIG interworking applies currently.
- A DCS trunk may be used as the bearer trunk on an SBS call. However, any DCS signaling information received on the Bearer call will be overridden with the QSIG signaling information received on the SBS signaling call.
- User information received on an SBS signaling call by an SBS Tandem Node, or received on a non-SBS trunk by an SBS Interworking Node will be sent on the SBS signaling call, per current tandeming or interworking procedures on QSIG trunks.
- Temporary Signaling Connection messages can be sent over an SBS trunk.
- Look Ahead Routing can be used with both SBS signaling and SBS bearer calls, if such calls are launched on ISDN trunks.
- In regions where Feature Plus (F+) is a viable offering, SBS calls can use the Feature Plus pseudo-DID functionality to avoid having to obtain DID/DDI numbers from a Service Provider. SBS Extensions would still need to be administered at the SBS Terminating Node, but these numbers would not need to correspond with real DID/DDI numbers. CPN Prefix administration at the SBS Terminating Node would need to map the SBS extension to a number that would be a national complete number (except that the SBS extension portion would not be recognized by the PSTN). ARS at the SBS Originating Node would need to route this number to a route pattern preference that supports Feature Plus. The "No. Dgts SubAddress" administration for this preference would need to indicate the length of the SBS extension at the SBS Terminating Node (this number of digits will be extracted from right to left and sent in the Calling Party Subaddress Information Element). Administration for this preference would also need to delete the SBS extension digits and insert the SBS Terminating Node’s Listed Directory Number extension in its place. The SBS bearer call would thus be routed to the LDN at the SBS Terminating Node and Feature Plus functionality at the SBS Terminating Node would then route the call to the SBS extension (passed in the Subaddress IE) instead of to the attendant. Multiple route patterns would be needed at the SBS Originating Node if the SBS Terminating Node uses SBS extensions of various lengths.

  Note:

  SBS extensions to be used with Feature Plus cannot be longer than five digits as Feature Plus is not included in Dial Plan Expansion.

- QSIG MSI messages will be sent in the SBS Signaling link. Any that are in the SBS bearer call will be ignored.
- QSIG Call Completion will work with SBS calls.

  Note:

  Both the original call, and the "call-back call" will incur separate SBS delays if using SBS trunks.

- QSIG Call Transfer will work with SBS calls.

  Note:

  Both the original call and the second call, to the transferred-to party, will incur separate SBS delays if using SBS trunks.

- QSIG Diversion (forward switch and reroute) will work with SBS calls.

  Note:

  Both the original call and the second call, to the forwarded-to party, will incur separate SBS delays if using SBS trunks.

- QSIG Path Replacement will work with SBS calls.

  Note:

  The entire SBS call, both the SBS signaling call and the associated SBS bearer call, will be replaced. All separate calls (the original call, the call to the transferred-to party, and then the path replacement call) will incur separate SBS delays if using SBS trunks.

- QSIG Enhanced Path Replacement will work with SBS calls. Multiple SBS delays will apply.
- Non-Avaya QSIG MSI will be tandemed to/from any non-SBS QSIG leg of an SBS call (at the SBS Interworking Node) and on the SBS signaling call (at an SBS Tandem Node) per existing QSIG Transit operation.
- QSIG MWI will work with SBS calls.
- QSIG Temporary Signaling Connections (TSCs), known as Call Independent Signaling Connections (CISCs) in QSIG literature are supported. Non Call Associated Temporary Signaling Connections (NCA TSCs) are signaling-only connections that transport feature information. While NCS TSCs may be initiated as a result of some activity on a bearer call, NCA TSCs are independent of bearer calls. They are set up as non-bearer calls and use a call reference value (CRV) that is different than any CRV in use on any other existing bearer or signaling call on that interface.

Communication Manager supports two different NCS TSC protocols administered via the signaling group **Supplementary Service Protocol** field. This field is set to **a** for AT&T NCA TSCs and to **b** is for QSIG NCA TSCs (CISCs).

For full QSIG functionality, the **Supplementary Service Protocol** field on both the trunk group form and the signaling group form must be set to **b** (QSIG). This is necessary because some QSIG features, such as QSIG Call Completion and QSIG Message Waiting Indication utilize QSIG feature signaling on both the bearer call and on an NCA TSC to work properly.

- QSIG Centralized Attendant Service with MSI will work with SBS calls.
- QSIG Transit Capabilities are supported with SBS calls via tandeming of QSIG signaling to/from any non-SBS QSIG leg of an SBS call (at the SBS Interworking Node) and on the SBS signaling call (at an SBS Tandem Node) per existing QSIG transit operation.
- QSIG VALU signaling will work with SBS calls. The timer used to return QSIG VALU Call Coverage calls back upon no answer may need to be lengthened so that SBS delays do not cause such calls to be returned too early. This timer is administrable via the **Local Cvg Subsequent Redirection/CFWD No An Interval (rings)** field on the **change system-parameters coverage-forwarding** command (Page 1).
- QSIG Called/Busy Name ID will be supported in the SBS signaling call.
- QSIG Calling/Connected Name/Number ID will be supported in the SBS signaling call.
- QSIG Call Offer will be supported as it would be over normal QSIG trunks.
- Automatic Alternate Routing (AAR) and/or Automatic Route Selection (ARS) can be used to route the SBS signaling call. SBS bearer calls are routed using ARS only but can be directed to AAR from ARS.
- SBS calls to an analog station endpoint will display the SBS signaling information if the endpoint is served by a TN793 or TN2793 port.
- The Russian Transit/Power Industry Tie Trunk is expected to work for SBS bearer calls. However, it will not be tested since the expectation is that it would never be used in this fashion due to the archaic technology used to provide that type of trunk.
- The X-Station Mobility feature will work for incoming or outgoing calls routed using SBS.
- Leave Word Calling (LWC) for Unanswered External Calls with Automatic Number Identification (ANI) is supported with the information in the SBS signaling call being stored for the called party.
- ISDN Feature Plus calls are supported, as the SBS bearer call, with the SBS signaling call information used for endpoint displays.
- ISDN Calling Party Number Presentation options are supported by SBS in the SBS signaling call.
- QSIG/DCS Partial Reroute will work per current operation, with the SBS signaling call as the QSIG part of the call.
- DS1 With Echo Cancellation is supported for the SBS bearer call.

Glossary

- CISC - Call Independent Signaling Connection. QSIG equivalent of a Non Call Associated Temporary Signaling Connection. Also known as simply a Temporary Signaling Connection. A connection between two switching systems used to pass information not related to a particular physical call.
- NCA TSC - Non Call Associated Temporary Signaling Connection. A connection between two switching systems used to pass information not related to a particular physical call. With the QSIG protocol this type of connection is defined as a CISC or Call Independent Signaling Connection.
- Originating Node - The Communication Manager based system (or other switch) where a call is initiated. The calling party is an endpoint on the Originating Node.
- SBS Interworking Node - The Communication Manager based system where an incoming SBS trunk call is interworked to a non-SBS trunk, or vice versa.
- SBS Originating Node - The Communication Manager based system where a call first invokes the use of an SBS trunk group for call completion. The SBS Originating Node can either be the Originating Node for the call or the SBS Interworking Node for the call (non-SBS trunk to SBS trunk call).
- SBS Extension - An Administered Without Hardware extension number translated at SBS Terminating Nodes. This extension number is used to identify and eventually associate a bearer call with a signaling call.
- SBS Terminating Node - The Communication Manager based system where a call last uses an SBS trunk group for call completion. The SBS Terminating Node can either be the Terminating Node for the call or the SBS Interworking Node for the call (SBS trunk to non-SBS trunk call).
- Terminating Node - The Communication Manager based system (or other switch) where a call is terminated. The called/Connected party is an endpoint on the Terminating Node.