

Connecting NEC UNIVERGE® SV9100 with Microsoft® Teams Direct Routing Enterprise Model using NEC BX Series SBC

Version History

| Version | Date | Notes and Changes |
|---------|------------|---|
| 1.0 | 30/03/2020 | 1. Initial draft of SV9100 integration document |
| 1.1 | 09/04/2020 | 1. Reviewed screenshot of SIP Interfaces |
| 1.2 | 31/01/2022 | 1. Updated call scenarios and updated number manipulation rules |
| 1.3 | 18/02/2022 | 1. Updated classification rules |

Contents

| Version History | 1 |
|---|-----|
| Purpose of this document: | . 3 |
| Scope of this document | . 3 |
| Prerequisites: | . 3 |
| Test Network | . 4 |
| General BX SBC Configuration | 5 |
| TLS Configuration | . 5 |
| Configure your TLS Context | . 5 |
| Deploy the Certificates and Private Key | . 6 |
| Deploy Baltimore Trusted Root Certificate | . 9 |
| Configure IP Interfaces and NAT Traversal | 10 |
| Configure Media Realms | 11 |
| Configure SIP Interfaces | 12 |
| Configure Proxy Sets and Proxy Addresses | 13 |
| Configure Coder Groups | 15 |
| Configure the IP Profile for Direct Routing to MS Teams | 16 |
| Configure the IP Profile for the SV9100 | 17 |
| Configure IP Groups | 18 |
| Enable SRTP Security Transcoding | 20 |
| Configure Classification conditions | 21 |
| Configure IP-to-IP Routing Rules | 23 |
| MS Teams Configuration | 24 |
| Connect the SBC to Microsoft Direct Routing | 24 |

\Orchestrating a brighter world NEC

| 1. Connect to MS Teams using an administrator account name and password 24 |
|---|
| 2. Connect to MS Teams using an administrator account with multi-factor authentication enabled 24 |
| Create the SBC gateway |
| Verify the link in the SBC Status pages |
| Enable the users for Enterprise Voice and assign on premise PSTN number |
| Configure Voice Routing |
| Create the PSTN Usage |
| Create an Online Voice Route |
| Create a new Voice Routing Policy |
| SV9100 Configuration |
| IP Trunk Setup |
| Configure Number Manipulation Rules |
| For Calls from MS Teams to SV9100 |
| Test the SIP trunk between MS Teams and SV9100 |
| Dialling from the SV9100 to MS Teams35 |
| Dialling from MS Teams to SV9100 |
| Configure F-Route |
| Configure ARS to remove dial delays – Optional 40 |
| Configure Coder Transcoding (Optional)42 |
| Tested Call Scenarios |

NEC

Purpose of this document:

This document is intended as a quick start guide for NEC's UNIVERGE[®] SV9100 integration with NEC BX series SBCs and Microsoft Teams. Functionality is provided using the Direct Routing feature of the BX Series SBC. Prior knowledge of IP networking and how to connect to a network will be necessary in order to understand the configuration examples and to be able to modify the examples contained in this document.

Knowledge of DNS and TLS Certificates is also required.

Scope of this document

This document demonstrates how to configure an NEC BX Series SBC connecting to Microsoft Teams and SV9100 SIP Tie Line. This guide assumes that the existing network already has separate VLANs for voice and data services.

This document covers configuration of the SV9100 using PCPro Programming tool and NEC BX Using the Web GUI.

The versions tested in this document are;

SV9100 CP20 Main Software 10.50.50 SV9100 CP20 PC Pro 10.30.51 NEC BX9000 7.20A.254.565

Integration is limited to voice dialling only. Video calls are not supported over Direct Routing trunks, BLF or presence information is not shared.

Prerequisites:

The following prerequisites are necessary in order to achieve MS Teams integration using Direct Routing.

Microsoft Office 365 Subscription

Microsoft Teams and Direct Routing are only offered through these Enterprise plans;

- E1 (Plan 2), E3 (Plan 2), or E5 (Plan 1 or 2)
- **E5 has 2 license Plans where Apps and Add-Ons are excluded (Plan 1) or included (Plan 2)

Apps, and Add-Ons needed to enable Teams Direct Routing:

- Microsoft 365 Audio Conferencing (optional for conference feature)
- Microsoft 365 Phone System (Formerly Skype for Business (SfB))

NEC BX SBC licensing

The minimum requirements for the BX SBC are;

- SBC Sessions For calls traversing the SBC, one session is required for each concurrent call
- BX MS Teams license Required for connection to MS Teams. This is a global license
- Transcoding licenses* Optional, recommended. Required for use of SILK NB and WB codecs

* Without transcoding capability G.711 codec will be used.

UNIVERGE® SV9100

MS Teams connection utilises the SIP trunking capability of the SV9100. For each SIP trunk the following is required;

- IP Trunk license (BE114065) One license is required for each concurrent call
- System Capacity license (BEBE114042) Required for additional system capacity

Network Infrastructure

The connection to MS Teams Cloud PBX is **only** supported using TLS. This means the following networking requirements must be met.

- Fixed public IP Address for WAN connection
- FQDN (Fully Qualified Domain Name) for the SBC
- DNS Entry for the SBC (for example sbc.customer.com) See connectivity diagram
- Public trusted certificate for the SBC (See this link for trusted CAs <u>https://docs.microsoft.com/en-us/microsoftteams/direct-routing-plan#public-trusted-certificate-for-the-sbc</u>)
- Firewall configuration supporting port forwarding for SIP connectivity See connectivity diagram
- DNS Server to resolve FQDN of MS Teams Cloud PBX service

Test Network

In the test network the SBC has two interfaces, one in the DMZ and one in the LAN. The PSTN is connected to the SV9100 and the MS Teams users are allowed to dial through the SV9100. It is also possible to connect the PSTN trunks to the SBC if a SIP carrier is used, or the hardware gateway.



Public DNS records have been created to resolve sbc.necdemo.co.uk to the public IP address of the customer router. The customer router then forwards connections from port TCP:5061 to the SBC.

General BX SBC Configuration

General configuration of the SBC is outside the scope of this document, for further detail please see integration whitepapers and training materials.

TLS Configuration

TLS is a mandatory requirement for connection with MS Teams.

If you already have a TLS certificate issued for this host/domain then it can be loaded directly into the SBC. Otherwise it is necessary to create a CSR (Certificate Signing Request) which is then issued by the CA (Certificate Authority). If you are purchasing a new TLS Security Certificate please check that the issuer is trusted by Microsoft (<u>https://docs.microsoft.com/en-us/microsoftteams/direct-routing-plan#public-trustedcertificate-for-the-sbc</u>)

Creating a CSR can be done from the *IP NETWORK > SECURITY > TLS Contexts* menu. For further information on creating the CSR please see the BX User Manuals.

Configure your TLS Context

To load your TLS Security Certificate into the BX;

- 1. Log into the web interface of the BX (for example <u>https://192.168.88.5</u>)
- 2. Navigate to IP NETWORK > SECURITY > TLS Contexts
- 3. Either modify the existing TLS Context (0*) or add a new TLS Context

*If you modify TLS context 0 this Security Certificate will also be used to secure the programming Web GUI of the SBC.

In the screenshot below the default TLS context has been renamed to 'NECDEMO', replace this name with your customer name, ensure that only TLSv1.2 is enabled and for further security restrict the supported Ciphers to HIGH only.

| NEC BX9000 | | | | | | - 🗆 × |
|-----------------|---|--------------------------|-----------------------|---------|----------------------------|-----------------------|
| NEC | SETUP MONITOR TROUBLES | | | Save | Reset Actions - | , Admin - |
| UNIVERGE BX9000 | IP NETWORK SIGNALING & ME | DIA ADMINISTRATION | | | Ç Ent | ity, parameter, value |
| SRD SRD | Contexts [NECDEMO] | | | | | - x |
| යි NETWC | | | | | | |
| CORE ENTI | GENERAL | | OCSP | | | |
| ▲ SECURITY | Index | 0 | OCSP Server | Disable | v | |
| TLS Contex | Name | NECDEMO | Primary OCSP Server | 0.0.0.0 | | |
| Firewall (0) | TLS Version | • TL5v1.2 ¥ | Secondary OCSP Server | 0.0.0.0 | | |
| Security Sec | DTLS Version | Any 🔻 | OCSP Port | 2560 | | |
| P QUALITY | Cipher Server | HIGH | OCSP Default Response | Reject | v | |
| ▶ DNS | Cipher Client | • HIGH | | | | |
| ▶ WEB SERVI | Strict Certificate Extension Validation | Disable 🔻 | | | | Edit |
| > HTTP PRO> | DH key Size | 1024 | | | | |
| ► RADIUS & L | TLS Renegotiation | Enable | | | | |
| NEDIA CUI | | | | | | |
| P MEDIA CEG | | | | | | |
| > ADVANCED | | | | | | |
| | | Cano | el APPLY | | | |
| | | DH key Size 1024 | | | | |
| | | TLS Renegotiation Enable | | | | |
| | | | | | | |

Deploy the Certificates and Private Key

In the SBC Web GUI return to the TLS Contexts page and do the following;

1. Select the required TLS Context index row (named NECDEMO) and then select the *Charge Certificate* link located at the bottom of the detail pane.

| NEC BX9000 | | | | | | | | - | |
|--|-----------------------------|-----------------------------|--|-----------------------|---------|-------|----------------------|------------------|--------------------|
| | BLESHOOT | | | | Save | Reset | Actions - | <mark>ل</mark> ې | Admin + |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA ADMINISTRATION | | | | | | , ○ Enti | ty, paramete | er, value |
| SRD All | | | | | | | | | |
| ☆ NETWORK VIEW | TLS Contexts (1) | | | | | | | | |
| CORE ENTITIES | | | | | | | | | |
| | + New Edit 💼 | | <pre>value of 1 >> >> Show</pre> | 10 🔻 records per page | | | | | Q |
| ▲ SECURITY | INDEX 🗢 | NAME | TLS VERSION | DTLS VERSION | I | | CIPHER SERVER | | |
| TLS Contexts (1) | 0 | NECDEMO | TLSv1.2 | Any | | 1 | HIGH | | |
| Firewall (0) | | | | | | | | | |
| becang secongs | | | | | | | | | |
| QUALITY | | | | | | | | | |
| ▶ DNS | | | | | | | | | |
| WEB SERVICES | #0[NECDEMO] | | | | | | | Ed | |
| HTTP PROXY | | | | | | | | | |
| | GENERAL | | | OCSP | | | | | |
| | Name | NECDEMO | | OCSP Server | Disable | | | | |
| MEDIA CLUSTER | TLS Version | • TLSv1.2 | | Primary OCSP Server | 0.0.0.0 | | | | |
| > ADVANCED | DTLS Version | Any | | Secondary OCSP Server | 0.0.0.0 | | | | |
| | Cipher Server | HIGH | | OCSP Port | 2560 | | | | |
| | Cipher Client | • HIGH | | OCSP Default Response | Reject | | | | |
| | Strict Certificate Extensio | Disable | | | | | | | |
| | TI S Representation | Fnable | | | | | | | |
| | res nanegotiation | LINDIC. | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | Certificate Information >> | Change Certificate >> | Trusted Root Certificates >> | | | | | | |

- 2. Scroll down to the UPLOAD CERTIFICATE FILES FROM YOUR COMPUTER group and upload your Private Key file and Device Certificate files*. If the Private Keu file is encrypted then enter the password in the pass-phrase box. When you upload the files you will see a verification if successful.
- * The uploaded certificate files should be PEM encoded with .pem, .cer or .crt file extension.

| NEC BX9000 | | | | | - | |
|---|--|------|-------|----------------------|------------------|--------------------|
| | | Save | Reset | Actions - | ۲ <mark>۵</mark> | Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING & ME | DIA ADMINISTRATION | | | 🔎 Enti | ty, paramete | er, value |
| SRD All | Private Key Size 1024 | | | | Ŧ | |
| | Private key pass-phrase (optional) | | | | | |
| CORE ENTITIES | Press the "Generate Private Key" button to create new private key. | | | | | |
| SECURITY | Press the "Generate Self-Signed Certificate" button to create self-signed certificate. Note that the certificate will use the subject name configured in "Certificate Signing Request" box. | | | | | |
| TLS Contexts (1) | Important: generation of private key is a lengthy operation during which the device service may be affected. | | | | | |
| Security Settings | Generate Private-Key Generate Sen-Signed Cerunitate | | | | | |
| ▶ QUALITY | TI S EXPIRY SETTINGS | | | | | |
| ▶ DNS | | | | | | |
| WEB SERVICES | TLS Expiry Check Start (days) 60 | | | | | |
| HTTP PROXY | LS Expiry Check Period (days) / Submit TLE Expire Solution | | | | | |
| PADILIS & LDAD | Sooning the expirit Security | | | | | - E |
| | UPLOAD CERTIFICATE FILES FROM YOUR COMPUTER | | | | | |
| MEDIA CLUSTER | | | | | | |
| > ADVANCED | Private key pass-phrase (optional) | | | | | |
| | Send Private Key file from your computer to the device. The file must be in either PEM or PFX (PKCS#12) format. Choose file No file chosen Load File | | | | | |
| | Note: Replacing the private key is not recommended but if it's done, it should be over a physically-secure network link. | | | | | |
| | Send Device Certificate file from your computer to the device. The file must be in textual PEM format. Characteristic file of the device file of the device. | | | | | |
| | | | | | | |



3. Validate that the certificate and private key were uploaded correctly. From the TLS Contexts page, choose the *Certificate Information* link to see detail about the uploaded certificate.

| NEC BX9000 | | | | | | | | - | |
|--|-----------------------------|-----------------------|---|-----------------------|---------|-------|----------------------|-----------------|--------------------|
| | LESHOOT | | | | Save | Reset | Actions + | <mark>لې</mark> | Admin + |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA ADMINISTRATION | | | | | | , ○ Entit | y, paramete | r, value |
| SRD All | | | | | | | | | |
| A NETWORK VIEW | TLS Contexts (1) | | | | | | | | |
| CORE ENTITIES | | | | | | | | | |
| | + New Edit 🗊 | | e <e 1="" of="" page="" show<="" td="" 🖂="" 😕=""><td>10 🔻 records per page</td><td></td><td></td><td></td><td></td><td>Ω</td></e> | 10 🔻 records per page | | | | | Ω |
| | INDEX 🗢 | NAME | TLS VERSION | DTLS VERSION | | | CIPHER SERVER | | |
| TLS Contexts (1) | 0 | NECDEMO | TLSv1.2 | Any | | | HIGH | | |
| Firewall (0) | | | | | | | | | |
| Security Securitys | | | | | | | | | |
| ▶ QUALITY | | | | | | | | | |
| > DNS | | | | | | | | | _ |
| WEB SERVICES | #0[NECDEMO] | | | | | | | Edit | |
| HTTP PROXY | | | | | | | | | |
| RADIUS & LDAP | GENERAL | | | OCSP | | | | | |
| | Name | NECDEMO | | OCSP Server | Disable | | | | |
| MEDIA CLUSTER | TLS Version | • TLSv1.2 | | Primary OCSP Server | 0.0.0.0 | | | | |
| > ADVANCED | DTLS Version | Any | | Secondary OCSP Server | 0.0.0.0 | | | | |
| | Cipher Server | • HIGH | | OCSP Port | 2560 | | | | |
| | Cipher Client | • HIGH | | OCSP Default Response | Reject | | | | |
| | Strict Certificate Extensio | Disable | | | | | | | |
| | DH key Size | 1024 | | | | | | | |
| | ILS Kenegotiation | chable | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | Certificate Information >> | Change Certificate >> | Trusted Root Certificates >> | | | | | | - I |
| | | | | | | | | | |

4. If the Status is OK then you can continue to the next steps, otherwise go back and check the uploaded files.

| NEC BX9000 | | | | | - | \Box \times |
|---|---|---------------|--------------|----------------------|------------------|--------------------|
| | | Save | Reset | Actions - | L <mark>9</mark> | Admin + |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA ADMINISTRATION | | | 🔎 Enti | ty, paramete | er, value |
| ↔ ↔ SRD All ▼ | | | | | | |
| NETWORK VIEW CORE ENTITIES SECURITY TLS Contexts (1) Firewall (0) Security Settings QUALITY DNS WEB SERVICES HTTP PROXY | TLS Context [#0] > Certificate Information PRIVATE KEY Key size: 2048 bits Status: 0K CERTIFICATE Certificate: Data: Version: 3 (0x2) Seral Number: 463396048943522278 (0x404f1091a6d81e6) Signature Algorithm: sha2560WIRRSAEntryption Issuer Cett, STT-Arizona, L-Scottsdale, O-GoDaddy.com, Inc., 0U+http://certs.godaddy.com/repository/, CN-Go Daddy Secure Ce Validity | rtificate Aut | thority - G2 | | | |
| MEDIA CLUSTER ADVANCED | Not After - Dec 20 13:22:24 2020 GMT Subject: Puolic Rey Into: Public Key Algorithm: rsaEncryption Public Key (2045 bit) Modulus: 00:05:70:40:9a:a8:66:15:17:50:13:04:5d:6b:6f: e7:8f:94:b9:b6:cd:a1:72:e9:50:44:88:56:70:75: a6:5d:70:95:cb:88:22:6a:d3:83:24:78:18:ddf3: 2f:54:68:36:75:45:24:ad:d3:83:5b:47:7a:20: | | | | | |
| | 54 e0 ar (23.75 sb); 77 65 80; 77 35; e0 55 d) 77 87; bd a6 ec; f8 27 f6 b1; b0; a7 8; cd) c5 d; 14 e3; f0; d5 5e fb; aaa a4 e1 81 89; 28; c1 ba 60 7; c8; b5 6a; eb; 38; 36 5; b0; c4; ad; 16; 6a; a3; b1; b8; 8; c; 31; c5; d9; 79; bb; 69; 61; 16; 7C; c4; af (09; 36; c0; 26; 31; a3; e1; 34; e1; f6; c2; 2a] b; e6; a2; c4; a5; d5; 37; a8; c5; c7; 17; c5; s9; c1; 27; 32; c1; b0; d4; c; 12; 29; ab; 82; 04; dr; 3b; 21; 55; cr]; 72; bc; c4; c5; c5; c5; c5; c5; c5; c4; c5; c4; c5; c4; c5; c4; c5; c5; c5; c5; c5; c5; c5; c5; c5; c5 | | | | | |

Orchestrating a brighter world

NEC

5. Upload the root and any intermediate certificates to the *Trusted Root Certificate* store. These are provided as part of the certificate bundle by the issuer and can be found in the issuer's online repository. In this example the certificate chain is part of the Go Daddy Secure Certificate Authority - G2 chain.

| NEC NEC BX9000 | | | | - 🗆 X |
|--|--|--|----------------------------------|------------------------------|
| | BLESHOOT | | Save Reset | Actions - Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING 8 | & MEDIA ADMINISTRATION | | | |
| SRD All | | | | |
| NETWORK VIEW | • TLS Context [#0] > Trusted Root Certific | ates | | |
| CORE ENTITIES | 1000 | | | Import Event Remove |
| ▲ SECURITY | | 1001100 | EVDIDEC | import export Remove |
| TLS Contexts (1) | 0 Go Daddy Secure Certificate Aut | Go Daddy Root Certificate Autho | 5/03/2031 | |
| Firewall (0) | 1 Go Daddy Root Certificate Autho | Go Daddy Root Certificate Autho | 12/31/2037 | |
| Security Settings | 2 Baltimore CyberTrust Root | Baltimore CyberTrust Root | 5/12/2025 | |
| ▶ QUALITY | | | | |
| ▶ DNS | | | | |
| ▶ WEB SERVICES | | I ≤ << Page 1 of 1 ⇒ ⊨I 10 ▼ | | View 1 - 3 of 3 |
| HTTP PROXY | Selected Row #0 | | | |
| ▶ RADIUS & LDAP | Certificate: | | | |
| MEDIA CLUSTER | Data: Version: 3 (0x2) | | | |
| ADVANCED | Senial Analysis (1) (b) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4 | om, Inc., CN=Go Daddy Root Certificate Authority - G2 com, Inc., OU=http://certs.godaddy.com/repository/, CN=Go Daddy S | ecure Certificate Authority - G2 | |

Deploy Baltimore Trusted Root Certificate



Note: Loading Baltimore Trusted Root Certificates to is mandatory for implementing an MTLS connection with the Microsoft Teams network.

The DNS name of the Teams Direct Routing interface is **sip.pstnhub.microsoft.com**. In this interface, a certificate is presented which is signed by Baltimore Cyber Baltimore CyberTrust Root with Serial Number: 02 00 00 b9 and SHA fingerprint: d4:de:20:d0:5e:66:fc: 53:fe:1a:50:88:2c:78:db:28:52:ca:e4:74.

To trust this certificate, your SBC *must* have the certificate in Trusted Certificates storage. Download the certificate from <u>https://cacert.omniroot.com/bc2025.pem</u> and follow the steps above to import the certificate to the Trusted Root storage.

Note: Before importing the Baltimore root certificate into the SBC, make sure it's in .PEM or .PFX format. If it isn't, you need to convert it to .PEM or .PFX format, otherwise the 'Failed to load new certificate' error message is displayed. To convert to PEM format, use Windows local store on any Windows OS and then export it as 'Base-64 encoded X.509 (.CER) certificate'.

Download the Baltimore Trusted Root certificate from the online repository here;

https://cacert.omniroot.com/bc2025.pem

| NEC BX9000 | | | | - | |
|--|--|---|----------------------------------|------------------|--------------------|
| | BLESHOOT | | Save Reset | Actions - | Admin + |
| UNIVERGE BX9000 IP NETWORK SIGNALING 8 | & MEDIA ADMINISTRATION | | | 💭 Entity, parame | eter, value |
| 📀 📀 SRD All 🔻 | | | | | |
| A NETWORK VIEW | • TLS Context [#0] > Trusted Root Certifi | cates | | | |
| CORE ENTITIES | View | | | Import Export | Remove |
| ▲ SECURITY | INDEX 🗢 SUBJECT | ISSUER | EXPIRES | | _ |
| TLS Contexts (1) | 0 Go Daddy Secure Certificate Aut | Go Daddy Root Certificate Autho | 5/03/2031 | | |
| Firewall (0) | 1 Go Daddy Root Certificate Autho | Go Daddy Root Certificate Autho | 12/31/2037 | | |
| Security Settings | 2 Baltimore CyberTrust Root | Baltimore CyberTrust Root | 5/12/2025 | | |
| ♦ QUALITY | | | | | |
| ▶ DNS | | | | | |
| ▶ WEB SERVICES | | I < << Page 1 of 1 ⇒ ⇒ 1 10 ▼ | | View 1 - 3 of | 3 |
| ► HTTP PROXY | Selected Row #0 | | | | |
| ▶ RADIUS & LDAP | Certificate: | | | | |
| ▶ MEDIA CLUSTER | Data: Version: 3 (0x2) Serial Number: 7 (0x7) | | | | |
| > ADVANCED | Senial Notifies 7, No.7, Signature Algorithm: Sna256WithRSAEncryption Issuer: CeUS; STaArtona, L=Souttaile, D=GoDaddy; Viot Before: May 3 07:00:00 2011 GMT Not Before: May 3 07:00:00 2011 GMT Subject: CeUS; STAArtona, L=Souttaile, D=GoDaddy Subject: CeUS; STAArtona, L=Souttaile, D=GoDaddy Modulus: 00594:05:01.01d=87570.014:84558a.7860 6338:25:00:ce056956:05:1141480+4ccc 4533ae.886:25:31ca1844558a.7860 6338:25:00:ce056956:05:1141480+4ccc 4533ae.886:25:31ca184558a.7860 6333ae.886:25:31ca184586.7558 6332ae.8360 63 | xom, Inc., CN=Go Daddy Root Certificate Authority - G2 .com, Inc., OU≃http://certs.godaddy.com/repository/, CN=Go Daddy Se | cure Certificate Auchority - G2. | | |

Upload the certificate to the Trusted Root Certificate store.



Configure IP Interfaces and NAT Traversal

In this example the SBC has one leg in the LAN and one leg in the DMZ network. The customer router is configured to forward the following ports to the DMZ interface of the SBC.

TLS Signalling – TCP:5061 RTP Media – UDP:7000~7199

For further information on IP Interface setup refer to the NEC BX SBC Training Material and the BX User Manuals.

NAT Translation if configured to ensure that SIP Signalling includes the Public IP address of the customer site instead of the internal private IP address.

| NEC BX9000 | | | | | | | | - 🗆 × |
|--|-------------------|-----------------------------------|-------------------|------------------|----------------------|-----------------|---------------|--------------------|
| | | | | | | Save Reset | Actions 🗸 🛛 📘 | Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA ADMINISTRAT | ION | | | | | 🔎 Entity, pa | rameter, value |
| | NAT Translation (| 2) . | | | | | | |
| | + New Edit 🗊 | | IN AN Page 1 | of 1 🗪 🖬 Show 1 | 0 🔻 records per page | | | Q |
| IP Interfaces (2) | | SOURCE INTEREACE | TARGET IR ADDRESS | SOLIDCE STADT DO | | TARGET START | | |
| Ethernet Devices (2) | 0 | DMZ Interface | 82.153.203.50 | 5060 | 5061 | 5060 | 5061 | |
| Physical Ports (3) | 1 | DMZ Interface | 82.153.203.50 | 7000 | 7199 | 7000 | 7199 | |
| Static Routes (0) | | | | | | | | |
| HA Settings | | | | | | | | |
| HA Network Monitor (0) | | | | | | | | |
| NAT Translation (2) | | | | | | | | |
| > SECURITY | #1 | | | | | | | Edit |
| ▶ QUALITY | | | | | | | | |
| > DNS | SOURCE | | | | TARGET | | | |
| | Source Interface | DMZ Interface | e | View | Target IP Address | • 82.153.203.50 | | |
| WEB SERVICES | Source Start Port | • 7000 | | | Target Start Port | • 7000 | | |
| HTTP PROXY | Source End Port | • 7199 | | | Target End Port | • 7199 | | |
| ▶ RADIUS & LDAP | | | | | | | | |
| MEDIA CLUSTER | | | | | | | | |
| ADVANCED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



Media Realms define the UDP ports used to terminate and generate RTP media on the device. Media Realms are defined in *SETUP > SIGNALING & MEDIA > CORE ENTITIES> Media Realms*. In the example below two Media Realms are defined;

LAN Media Realm – This is bound to the LAN IP Interface and occupies UDP ports 6000~6199 WAN Media Realm – This is bound to the WAN IP Interface and occupies UDP ports 7000~7199

| NEC BX9000 | | | | | | | - 🗆 X |
|--|-----------------------|---------------------------------|---------------------------------------|---------------|---|-----------------|----------------------------|
| | RIESHOOT | | | | | Save Reset | Actions + |
| | | | | | | | |
| UNIVERGE BX9000 IP NETWORK SIGNALING 8 | MEDIA ADMINISTRAT | ION | | | | | D Entity, parameter, value |
| (SRD All | | | | | | | |
| | | | | | | | |
| | Media Realms (2) | | | | | | |
| | | | | | | | |
| CORE ENTITIES | + New Edit 💼 | | I I I I I I I I I I I I I I I I I I I | of 1 🕞 ы Show | v 10 🔻 records per page | | Q |
| SRDs (1) | | | | | NUMBER OF MEDIA | | |
| Media Realms (2) | | INAME | | CODE PORT RA | SESSION LEGS | COP PORT RANGET | |
| Proxy Sets (3) | 1 | WAN Media Realm | DMZ Interface | 7000 | 50 | 7199 | No |
| IP Groups (3) | | | | | | | |
| CODERS & PROFILES | | | | | | | |
| > SBC | | | | | | | |
| | | | | | | | |
| SIP DEFINITIONS | #0[LAN Media Re | ealm] | | | | | Edit |
| MESSAGE MANIPULATION | | | | | | | |
| ▶ MEDIA | GENERAL | | | | QUALITY OF EXPERIENCE | | |
| | Name | LAN Media Re | ealm | | QoE Profile | - | View |
| INTRUSION DETECTION | Topology Location | Down | | | Bandwidth Profile | | View |
| | IPv4 Interface Name | LAN Interface | | View | | | |
| | UDP Port Range Star | rt • 6000 | | | | | |
| | Number Of Media S | essio • 50 | | | | | |
| | UDP Port Range End | 6199 | | | | | |
| | TCP Port Range Star | . 0 | | | | | |
| | Default Media Realn | n • Yes | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| NEC SETUP MONITOR TROUE | BLESHOOT | | | | | Save Reset | Actions - 🖵 Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING 8 | MEDIA ADMINISTRAT | TON | | | | | |
| | | | | | | | |
| (•) (•) SRD All 🔻 | | | | | | | |
| | | | | | | | |
| C TOPOLOGY VIEW | Media Realms (2) | | | | | | |
| ▲ CORE ENTITIES | A Now Edit | | Page 1 | of 1 | | | 0 |
| SRDs (1) | | | in on Longe | | V To + records per page | | ~ |
| SIP Interfaces (2) | INDEX 🗢 | NAME | IPV4 INTERFACE NAME | UDP PORT RA | NGE START NUMBER OF MEDIA SESSION LEGS | UDP PORT RANGE | ND DEFAULT MEDIA REALM |
| Media Realms (2) | 0 | LAN Media Realm | LAN Interface | 6000 | 50 | 6199 | Yes |
| IP Groups (3) | 1 | WAN Media Realm | DMZ Interface | 7000 | 50 | 7199 | No |
| | | | | | | | |
| CODERS & PROFILES | | | | | | | |
| ▶ SBC | | | | | | | |
| SIP DEFINITIONS | #10WAN Media | Pealm1 | | | | | Edit |
| | | leaning | | | | | Luit |
| MESSAGE MANIPULATION | | | | | | | |
| MEDIA | GENERAL | | | | QUALITY OF EXPERIENCE | | |
| INTRUSION DETECTION | Name | WAN Media F | tealm | | QoE Profile | | View |
| | Topology Location | • Up | | | Bandwidth Profile | | View |
| | UDP Port Papers Stor | DM2 Interfac | e | view | | | |
| | Number Of Media S | essio • 50 | | | | | |
| | UDP Port Range End | I 7199 | | | | | |
| | TCP Port Range Star | t 0 | | | | | |
| | TCP Port Range End | 0 | | | | | |
| | Default Media Realm | n No | | | | | |
| | | | | | | | |
| | | | | | | | |
| | Media Realm Extension | 0 items >> Remote | e Media Subnet 0 items >> | | | | |



This section shows how to configure the SIP listening interfaces for the SBC. SIP communication between the SBC and MS Teams only supports TLS transport. Please note the configuration below is only an example and may change if you have connections to other services such as SIP Carriers or Branch Offices using the same interface.

It is good practise to disable any transports which are not being used. SIP Interfaces are configured under SETUP > SIGNALING & MEDIA > CORE ENTITIES > SIP Interfaces.



Note: The Direct Routing interface can only use TLS for a SIP port. It does not support using TCP due to security reasons. The SIP port might be any port of your choice. When pairing the SBC with Office 365, the chosen port is specified in the pairing command.

The LAN SIP Interface is used to terminate SIP signalling between the SBC and SV9100 PBX. The WAN SIP Interface is used to terminate SIP signalling between the SBC and MS Teams Cloud PBX.

| | TROUBLESHOOT | | | | | | Save Reset | Actions - | 🗘 Adn |
|---|--|---|--|---------------------------------------|--|-----------------|--|---------------------------|----------------------|
| IVERGE BX9000 IP NETWORK SIGNA | ALING & MEDIA ADMINISTRATION | | | | | | | 💭 Entity, p | parameter, value |
| SRD All | | | | | | | | | |
| | | | | | | | | | |
| C TOPOLOGY VIEW | SIP Interfaces (2) | | | | | | | | |
| CORE ENTITIES | | | Dage 1 of | | 10 - | | | | 0 |
| SRDs (1) | | | ia <a td="" rage i0i<=""><td>I I I I I I I I I I I I I I I I I I I</td><td>w lo • records per</td><td>page</td><td></td><td></td><td>~</td> | I I I I I I I I I I I I I I I I I I I | w lo • records per | page | | | ~ |
| SIP Interfaces (2) | INDEX 🗢 NAME | SRD | NETWORK API INTERFACE TYP | PLICATION PE | UDP PORT | TCP PORT | TLS PORT | ENCAPSULATING PROTOCOL | MEDIA REALM |
| Media Realms (2) | 0 LAN SIP Inter | face DefaultSRD (#0) | LAN Interface SBC | | 5060 | 0 | 0 | No encapsulation | LAN Media Rei |
| Proxy Sets (3) | 1 WAN SIP Inte | rface DefaultSRD (#0) | DMZ Interface SBC | : | 0 | 0 | 5061 | No encapsulation | WAN Media Re |
| IP Groups (3) | _ | | | | | | | | |
| CODERS & PROFILES | | | | | | | | | |
| ⊿ SBC | | | | | | | | | |
| Classification (1) | #O[I AN SIR Interface] | | | | | | | | Edit |
| | #ULAN SETURETALE | Delaulisko | | | | | | | Conc |
| ▲ Routing | | | | | | | | | |
| A Routing Policies (1) | | | | | | | | | |
| Routing Routing Policies (1) IP-to-IP Routing (5) | GENERAL | | | | MEDIA | | | | |
| Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) | GENERAL | LAN SIP Interface | | | MEDIA Media Realm | | LAN Media Realm | | View |
| Acouting Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Manipulation | GENERAL Name Topology Location | LAN SIP Interface Down | | | MEDIA Media Realm Direct Media | | LAN Media Realm Disable | | View |
| Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Manipulation SSC General Settings | GENERAL Name Topology Location Network Interface | LAN SIP Interface Down LAN Interface | | View | MEDIA Media Realm Direct Media | | • LAN Media Realm Disable | | View |
| Routing Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Manpulation SBC General Settings Call Admission Control Profile (0) | GENERAL Name Topology Location Network Interface Apolication Type | LAN SIP Interface Down LAN Interface SBC | | View | MEDIA Media Realm Direct Media | | LAN Media Realm Disable | | View |
| A Routing Routing Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Mainpulation SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) | GENERAL Name Topology Location Network Interface Application Type UDP Port | LAN SIP Interface Down LAN Interface SBC 5060 | | View | MEDIA Media Realm Direct Media SECURITY | | LAN Media Realm Disable | | View |
| Routing Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Manipulation SBC General Settings Call Admission Control Profile (0) Malicous Signature (12) External Media Source (0) | GENERAL Name Topology Location Network Interface Application Type UDP Port | LAN SIP Interface Down LAN Interface SBC S060 0 | | View | MEDIA Media Realm Direct Media SECURITY TLS Context Nar | ne | • LAN Media Realm Disable • | | View |
| A Routing Routing Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP foroup Set (0) Manipulation SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SIP DEFINITIONS | GENERAL Name Topology Location Network Interface Application Type UDP Port TCP Port TCP Port | LAN SIP Interface Down LAN Interface SSC S060 0 0 | | View | MEDIA Media Realm Direct Media SECURITY TLS Context Nar TLS Mutual Aut | ne ienticati | LAN Media Realm Disable ··· | | View |
| Routing Routing Policies (1) IP-to-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Manipulation SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) \$IP DEFINITIONS | GENERAL Name Topology Location Network Interface Application Type UDP Port TCP Port TLS Port SCTP Port | LAN SIP Interface Down LAN Interface SBC S060 0 0 0 | | View | MEDIA Media Realm Direct Media SECURITY TLS Context Nar TLS Mutual Aut Message Policy | ne tenticati | LAN Media Realm Disable | | View View View |
| ▲ Routing Policies (1) Pot-tip Pouting (5) Alternative Reasons Set (0) IP Group Set (0) ▶ Manipulation SEC General Settings Cail Admission Control Profile (0) Malicious Signature (12) External Media Source (0) ▶ SIP DEFINITIONS ▶ MESSAGE MANIPULATION | GENERAL Name Topology Location Network Interface Application Type UDP Port TCP Port TCP Port SCTP Port | LAN SIP Interface Down LAN Interface SBC S060 0 0 0 0 | | View | MEDIA Media Realm Direct Media SECURITY TLS Context Nar TLS Mutual Aut Message Policy User Security M | ne ienticati | LAN Media Realm Disable Not Configured | | View View View |



Note: For implementing an MTLS connection with the Microsoft Teams network, configure 'TLS Mutual Authentication' to "Enable" for the Teams SIP Interface.

| Name | Network Interface | Application Type | UDP Port | TCP Port | TLS Port | Enable TCP | Classification Failure | Media Realm | TLS Context | TLS Mutual Authentication |
|-----------|----------------------|---------------------|-------------|-------------|-------------|---------------|---------------------------|----------------|----------------|------------------------------|
| | | | | | | Keepalive | Response | | Name | |
| LAN SIP | LAN | SBC | 5060 | 0 | 0 | Disable | 500 | LAN | - | - |
| Interface | Interface | | | | | | | Media | | |
| | | | | | | | | Realm | | |
| WAN SIP | WAN | SBC | 0 | 0 | 5061 | Enable | 0 | WAN | NECDEMO | - |
| Interface | Interface | | | | | | | Media | | |
| | | | | | | | | Realm | | |

* <u>Note!</u> Loading the Baltimore Trusted Root Certificate is mandatory for implementing MLTS connection.

Configure Proxy Sets and Proxy Addresses

The Proxy set defines a service connected to the SBC, the parameters, ports hostnames or IP addresses which are used to communicate with this service.

Microsoft Cloud PBX provides three redundant FQDNs for resiliency.

- sip.pstnhub.microsoft.com Global FQDN must be tried first. When the SBC sends a request to
 resolve this name, the Microsoft Azure DNS servers return an IP address pointing to the primary
 Azure datacentre assigned to the SBC. The assignment is based on performance metrics of the
 datacentres and geographical proximity to the SBC. The IP address returned corresponds to the
 primary FQDN.
- sip2.pstnhub.microsoft.com Secondary FQDN geographically maps to the second priority region.
- sip3.pstnhub.microsoft.com Tertiary FQDN geographically maps to the third priority region.

For more information see Microsoft Documentation (<u>https://docs.microsoft.com/en-us/microsoftteams/direct-routing-plan#sip-signaling-fqdns</u>).

To configure the Proxy Sets navigate to SETUP > SIGNALING & MEDIA > CORE ENTITIES > Proxy Sets.

In this example SIP Trunk Profile 2 is used on the SV9100. If Profile 1 is used change the signalling port from 5062 to 5060.

1. Configure a Proxy Set for the SV9100. Ensure that OPTIONS method is selected for the Proxy Keep-Alive method and that the LAN SIP Interface is used. Using the Proxy Address child table (link at bottom of the page) configure the IP:Port of the SV9100.

| NEC NEC BX9000 | | | | | | | | | - | \Box × |
|--|------------------------------|--------------------------------------|-----------------------|-----------------|---------------------------|----------|--------------|----------------------|---------------------|--------------------|
| | ESHOOT | | | | | Save | e Reset | Actions + | Ļ | Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING & N | AEDIA ADMINISTRATIC |)N | | | | | | O E | - ntitv. paramet | er. value |
| | | | | | | | | | icity, poromee | |
| 🗢 🕞 SRD All 🔻 | | | | | | | | | | |
| | A Nove Edit | | Dame 1 of 1 | Change 1 | 0 - | | | | | 0 |
| C TOPOLOGY VIEW | • New Cuit | | ia ca Page | Show | records per page | | | | | ~ |
| CORE ENTITIES | INDEX 🗢 | NAME | SRD SBC | IPV4 SIP INTE | RFACE [SEC] | IVE TIME | REDUNDANCY M | ODE PR | OXY HOT SWA | P |
| SRDs (1) | 0 | ProxySet_0 | DefaultSRD (#0) LAN | I SIP Interface | 60 | | | Di | sable | |
| SIP Interfaces (2) | 1 | SV9100 | DefaultSRD (#0) LAN | I SIP Interface | 60 | | | Di | sable | |
| Media Realms (2) | 2 | MS Teams | DefaultSRD (#0) WA1 | N SIP Interface | 60 | | | Di | sable | |
| Proxy Sets (3) | | | | | | | | | | |
| IP Groups (3) | | | | | | | | | | |
| CODERS & PROFILES | | | | | | | | | | _ |
| | #1[SV9100] | faultSRD | | | | | | | Ed | it 🎽 |
| ⊿ SBC | **[515100] <mark>_</mark> 50 | idano no | | | | | | | | |
| Classification (1) | | | | | | | | | | |
| ▲ Routing | GENERAL | | | | REDUNDANCY | | | | | |
| Routing Policies (1) | Name | SV9100 | | | Redundancy Mode | | | | | |
| IP-to-IP Routing (5) | SBC IPv4 SIP Interface | e LAN SIR Interfac | | View | Provy Hot Swan | Dis | able | | | |
| Alternative Reasons Set (0) | SBC IP V4 SIP Interface | EARLOIP Internac | .c | view | Proxy not swap | Dist | | | | |
| IP Group Set (0) | TLS Context Name | | | view | Proxy Load Balancing M | Disa | able | | | |
| Manipulation | | | | | Min. Active Servers for L | 1 | | | | |
| SBC General Settings | KEEP ALIVE | | | | | | | | | |
| Call Admission Control Profile (0) | Proxy Keep-Alive | Using OPTIONS | | | ADVANCED | | | | | |
| Malicious Signature (12) | Proxy Keen-Alive Time | Is 60 | | _ | Classification Input | IP A | ddress only | | | |
| External Media Source (0) | Koop Alive Failure Per | | | | DNS Deselve Method | | | | | |
| SIP DEFINITIONS | Sussess Detection Pat | der 1 | | | Divo Resolve Metrido | | | | | |
| | Success Detection Inte | nval 10 | | | | | | | | - 1 |
| MESSAGE MANIPULATION | Eailure Detection Patra | -1 | | | PROXY ADDRESS | TYPE | | | | |
| > MEDIA | Palitire Detection Retro | ans •1 | | | 192.168.88.160:5062 | UDI | P | | | |
| | | - | | | | | | | | |
| INTRUSION DETECTION | Proxy Address 1 items >> | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | - (1) | | | | | | | | | |
| Proxy Sets [#1] > Proxy Addres | SS (1) . | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | 0 |
| + New Edit | 14 <4 | Page 1 Of 1 🔛 | ▶ Show 10 ▼ records p | per page | | | | | | 2 |
| INDEX 🚖 | PR | OXY ADDRESS | | | TRANSPORT | TYPE | | | | |
| | | 100.00.100.5000 | | | UDD | | | | | |
| 0 | 19: | 2.168.88.160:5062 | | | UDP | | | | | |

2. Configure a Proxy Set for MS Teams. Ensure that OPTIONS method is selected for the Proxy Keep-Alive method and that the WAN SIP Interface is used. Using the Proxy Address child table (link at bottom of the page) configure the FQDN addresses for MS Cloud PBX.

| C BX9000 | | | | | | | _ | - | |
|---|---|---|-----------------|-------------------|--|---------------------------------------|----------------------|-----------------------|----------|
| JEC SETUP MONITOR | TROUBLESHOOT | | | | | Save Reset | Actions - | Д ⁰ | |
| IVERGE BX9000 IP NETWORK SIGN | ALING & MEDIA ADMINIST | RATION | | | | | 💭 Entiț | y, parameter | r, val |
| | | | | | | | | | |
| SKD AII Y | | | | | | | | | |
| | + New Edit | â | 🔫 🛹 Page 1 | of 1 🎫 🖬 Show 🔤 | □ ▼ records per page | | | | \$ |
| | INDEX 🗢 | NAME | SRD | SBC IPV4 SIP INT | ERFACE PROXY KEEP-ALIVE | E TIME REDUNDANCY | MODE PRO | XY HOT SWAP | <u>،</u> |
| SRDs (1) | 0 | ProxySet 0 | DefaultSRD (#0) | LAN SIP Interface | 60 | | Disa | ble | |
| SIP Interfaces (2) | 1 | SV9100 | DefaultSRD (#0) | LAN SIP Interface | 60 | | Disa | ble | _ |
| Media Realms (2) | 2 | MS Teams | DefaultSRD (#0) | WAN SIP Interfac | e 60 | | Enat | le | |
| Proxy Sets (3) | | | | | | | | | - |
| IP Groups (3) | - | | | | | | | | |
| | | | | | | | | | |
| CODERS & PROFILES | | | | | | | | | _ |
| 595 | #2[MS Teams] | DefaultSRD | | | | | | Edit | |
| I SBC | | | | | | | | | |
| Classification (1) | | | | | | | | | |
| A Routing | GENERAL | | | | REDUNDANCY | | | | |
| Routing Policies (1) | Name | MS Teams | | | Redundancy Mode | | | | |
| IP-to-IP Routing (5) | SBC IPv4 SIP Inte | rface • WAN SIP I | nterface | View | Proxy Hot Swap | Enable | | | |
| Alternative Reasons Set (0) | TLS Context Nam | e | | View | Proxy Load Balancing M | Random Weights | | | |
| IP Group Set (0) | | | | | Min. Active Servers for I | 1 | | | - |
| Manipulation | | | | | Min. Active Servers for E | | | | |
| | KEEP ALIVE | | | | | | | | |
| SBC General Settings | | | | | | | | | |
| SBC General Settings Call Admission Control Profile (0) | Proxy Keep-Alive | Using OPT | TONS | | ADVANCED | | | | |
| SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) | Proxy Keep-Alive Proxy Keep-Alive | Using OPT Time [s 60 | IONS | | ADVANCED Classification Input | IP Address only | | | |
| SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) | Proxy Keep-Alive Proxy Keep-Alive Keep-Alive Failure | Using OPT Time [s 60 e Respo | IONS | | ADVANCED Classification Input DNS Resolve Method | IP Address only | | | |
| SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SIP DEFINITIONS | Proxy Keep-Alive Proxy Keep-Alive Keep-Alive Failure Success Detection | Using OP1 Time [s 60 e Respo n Retries 1 | IONS | | ADVANCED Classification Input DNS Resolve Method | IP Address only | | | |
| SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SIP DEFINITIONS MESSAGE MANIPULATION | Proxy Keep-Alive Proxy Keep-Alive Keep-Alive Failure Success Detection Success Detection | Using OP1 Time [s 60 e Respo n Retries 1 n Interval 10 | IONS | | ADVANCED Classification Input DNS Resolve Method | IP Address only | | | |
| SPC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SIP DEFINITIONS MESSAGE MANIPULATION | Proxy Keep-Alive Proxy Keep-Alive Keep-Alive Failuri Success Detection Success Detection Failure Detection | Using OP1 Time [s 60 Respo N Retries 1 In Interval 10 Retrans -1 | 10N5 | | ADVANCED Classification Input DNS Resolve Method PROXY ADDRESS sign astropula microsoft c | IP Address only TYPE TIS | | | |
| SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SIP DEFINITIONS MESSAGE MANIPULATION MEDIA | Proxy Keep-Alive Proxy Keep-Alive Keep-Alive Failur Success Detection Success Detection Failure Detection | Using OP1 Time [s 60 Respo n Retries 1 n Interval 10 Retrans1 | IONS | | ADVANCED Classification Input DNS Resolve Method PROXY ADDRESS sip.pstnhub.microsoft.c | IP Address only TYPE TLS | | | |
| SBC General Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SIP DEFINITIONS MESSAGE MANIPULATION MEDIA | Proxy Keep-Alive Proxy Keep-Alive Keep-Alive Failun Success Detection Success Detection Failure Detection | Using OP1 Time [s 60 e Respo Retries 1 n Interval 10 Retrans1 | IONS | | ADVANCED Classification Input DNS Resolve Method PROXY ADDRESS sip.pstnhub.microsoft.c sip2.pstnhub.microsoft.c | IP Address only TYPE TLS TLS | | | |

| Proxy Sets [#2] > Proxy Address (3) . | | | |
|---------------------------------------|--|----------------|---|
| + New Edit 🕅 | I age 1 of 1 is I Show 10 V records per page | | Q |
| INDEX 🗢 | PROXY ADDRESS | TRANSPORT TYPE | |
| 0 | sip.pstnhub.microsoft.com:5061 | TLS | |
| 1 | sip2.pstnhub.microsoft.com:5061 | TLS | |
| 2 | sip3.pstnhub.microsoft.com:5061 | TLS | |

| Index | Proxy Address | Transport Type | Proxy Priority | Proxy Random Weight |
|-------|---------------------------------|----------------|----------------|---------------------|
| 0 | sip.pstnhub.microsoft.com:5061 | TLS | 1 | 1 |
| 1 | sip2.pstnhub.microsoft.com:5061 | TLS | 2 | 1 |
| 2 | sip3.pstnhub.microsoft.com:5061 | TLS | 3 | 1 |



This section describes how to configure coders. Teams Direct Routing supports SILK NB and WB codecs as well as G.711. To create the coder group navigate to *SETUP* > *SIGNALING* & *MEDIA* > *CODERS* & *PROFILES* > *Coder Groups*. Enable the codecs which you would like to use towards MS Teams. Transcoding is optional and described later in this document.

| NEC BX9000 | | | | | | | | | | | | | - | |
|--|----------------------|---|---------------|----------|-----------|-----------|--------------|----------------|------|---|---------------|-------------------|----------------|--------------------|
| | LESHOOT | | | | | | | | Save | R | leset Act | ions - | L ⁰ | Admin + |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA ADMINISTRATION | | | | | | | | | | | D Entity, | paramete | er, value |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| C TOPOLOGY VIEW | Coder Groups | | | | | | | | | | | | | |
| CORE ENTITIES | | Г | | | | | | | | | | | | |
| CODERS & PROFILES | | Ľ | Coder Group N | lame 1: | AUGIOCOGE | rsGroups_ | Delete Grou | IP . | | | | | | |
| IP Profiles (2) | Coder Name | | Packetizat | ion Time | Ra | te | Payload Type | Silence Suppre | sion | | Coder Specifi | c | | |
| Coder Settings | SILK-NB | T | 20 | Ŧ | 8 | T | 103 | N/A | T | | | | | |
| Coder Groups | SILK-WB | • | 20 | • | 16 | • | 104 | N/A | • | | | | | |
| Allowed Audio Coders Groups (2) | G.711A-law | • | 20 | • | 64 | • | 8 | Disabled | • | | | | | |
| Allowed Video Coders Groups (0) | G.729 | T | 20 | • | 8 | • | 18 | Disabled | T | | | | - | |
| > SBC | | • | | • | | • | | | • | | | | | |
| | | • | | • | | • | | | - T | | | | - | |
| SIP DEFINITIONS | | • | | • | | • | | | • | | | | - | |
| MESSAGE MANIPULATION | | • | | • | | • | | | • | _ | | | - | |
| | | • | | • | | • | | | • | | | | - | |
| MEDIA | | Y | | • | | • | | | Y | | | | | |
| INTRUSION DETECTION | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | Ca | ncel APPLY | | | | | | | |
| | | | | | | | | | | | | | | |

Configure the IP Profile for Direct Routing to MS Teams

This section describes how to configure IP Profiles. An IP Profile is a set of parameters with user-defined settings related to signalling (e.g., SIP message terminations such as REFER) and media (e.g., coder type). An IP Profile needs to be assigned to the specific IP Group.

1. Open the IP Profiles table in *SETUP > SIGNALING & MEDIA > CODERS & PROFILES > IP Profiles.* Use the **+New** button to add a new IP Profile.

| VEC BX9000 | | | | | | - | |
|----------------|---------------------------|----------------------------|-----------------|---------------------------------|---|-----------------|--------------|
| NEC | SETUP MONITOR TROU | BLESHOOT | | | Save Reset | Actions 🗸 🗸 🗸 | Adm |
| NIVERGE BX9000 | IP NETWORK SIGNALING | MEDIA ADMINISTRATION | | | | 🔎 Entity, parar | meter, value |
| SRD All | • | | | | | | |
| | | | | | | | |
| ☆ TOPOL | ofiles | | | | | - x | |
| CORE ENTI | | | | | | - | 0 |
| CODERS & | GENERAL | | | SBC SIGNALING | | | ~ |
| IP Profiles (| Index | 2 | | PRACK Mode | Transparent | Ŧ | |
| Coder Setti | Name | MS Teams | | P-Asserted-Identity Header Mode | As Is | ¥ | |
| Allowed Au | Created by Routing Server | | | Diversion Header Mode | As Is | T | |
| Allowed Vid | | | | History-Info Header Mode | As Is | T | |
| > SBC | MEDIA SECURITY | | | Session Expires Mode | Transparent | T | |
| SIP DEFINIT | SBC Media Security Mode | Secured | Υ. | SIP UPDATE Support | Not Supported | * | Edit |
| MESSAGE N | Symmetric MKI | Disable | ٠ | Remote re-INVITE | Supported only with SDP | * | |
| MEDIA | MKI Size | 0 | | Remote Delayed Offer Support | Not Supported | • | |
| | SBC Enforce MKI Size | Don't enforce | • | MSRP re-INVITE/UPDATE | Supported | • | |
| | SBC Media Security Method | SDES | • | MSRP Offer Setup Role | ActPass | v | |
| | Reset SRTP Upon Re-key | Disable | • | MSRP Empty Message Format | Default | • | |
| | Generate SRTP Keys Mode | Only If Required | • | Remote Representation Mode | According to Operation Mode | • | |
| | | | Cancel | APPLY | | | |
| | | SBC Enforce MKI Size D | on't enforce | | Remote Delayed Offer S Not Supported | | |
| | | SBC Media Security Meth Si | DES | | MSRP re-INVITE/UPDATE Supported | | |
| | | Reset SRTP Upon Re-key D | isable | | MSRP Empty Message F Default | | |
| | | Generate SRTP Keys Mode O | niy it kequired | | Remote Representation According to Operal | ition Mode | |

| Name | Parameter |
|---|--|
| General | |
| Name | MS Teams IP Profile (arbitrary descriptive name) |
| Media Security | |
| SBC Media Security Mode | Secured |
| SBC Early Media | |
| Remote Early Media RTP Detection Mode | By Media (required, as Teams Direct Routing does not send RTP immediately to remote side when it sends a SIP 18X response) |
| SBC Media | |
| Extension Coders Group | AudioCodersGroups_1 |
| RTCP Mode | Generate Always (required, as some ITSPs do not send RTCP packets during Hold, but Microsoft expects them) |
| ICE Mode | Lite (required only when Media Bypass enabled on Teams) |
| SBC Signaling | |
| Remote Update Support | Not Supported |
| Remote re-INVITE Support | Supported Only With SDP |
| Remote Delayed Offer Support | Not Supported |
| SBC Forward and Transfer | |
| Remote Refer Mode | Handle Locally |
| Remote Replaces Mode | Handle Locally |
| Remote 3XX Mode | Handle Locally |
| SBC Hold | |
| Remote Hold Format | Inactive (some SIP Trunk may answer with a=inactive and IP=0.0.0.0 in response |
| | to the Re-Invite with Hold request from Teams. Microsoft Media Stack doesn't |
| | support this format. So, SBC will replace 0.0.0.0 with its IP address) |
| All other parameters can be left unchanged at | their default values. |



Configure the IP Profile for the SV9100

1. Open the IP Profiles table in SETUP > SIGNALING & MEDIA > CODERS & PROFILES > IP Profiles. Use the **+New** button to add a new IP Profile.

| EC BX9000 | | | | | | | | - | |
|----------------------------|-----------------------------|-------------------------|------------------|---------------------------------|------------------------|------------------|-------------------------|------------------|------------|
| | SETUP MONITOR TROU | BLESHOOT | | | | Save Res | et Actions - | Ц <mark>Р</mark> | Admin |
| NIVERGE BX9000 | IP NETWORK SIGNALING | & MEDIA ADMINISTRATION | | | | | ♀ Enti | y, paramet | ter, value |
|) (| Ψ. | | | | | | | | |
| (0.0 | | | | | | | | | |
| | offiles [SV9100 IP Profile] | | | | | | | - × | |
| CORE ENTI | | | | | | | | | Q |
| CODERS & | GENERAL | | | SBC SIGNALING | | | | | |
| IP Profiles (| Index | 1 | | PRACK Mode | Transparent | | * | | |
| Coder Settii Coder Grou | Name | SV9100 IP Profile | | P-Asserted-Identity Header Mode | e o Add | | • | | |
| Allowed Au | Created by Routing Server | No | | Diversion Header Mode | As Is | | • | | |
| Allowed Vid | | | | History-Info Header Mode | As Is | | | | |
| > SBC | MEDIA SECURITY | | | Session Expires Mode | Transparent | | * | | |
| SIP DEFINIT | SBC Media Security Mode | Not Secured | × | SIP UPDATE Support | Supported | | • | Ec | dit |
| MESSAGE N | Symmetric MKI | Disable | × | Remote re-INVITE | Supported | | ٣ | | |
| MEDIA | MKI Size | 0 | | Remote Delayed Offer Support | Supported | | | | |
| | SBC Enforce MKI Size | Don't enforce | ٣ | MSRP re-INVITE/UPDATE | Supported | | | | |
| P INTROSION | SBC Media Security Method | SDES | Ŧ | MSRP Offer Setup Role | ActPass | | * | | |
| | Reset SRTP Upon Re-key | Disable | Ŧ | MSRP Empty Message Format | Default | | * | | |
| | Generate SRTP Keys Mode | Only If Required | • | Remote Representation Mode | According to Operation | Mode | ٣ | | |
| | | | Cancel | APPLY | | | | | |
| | | SBC Enforce MKI Size | Don't enforce | | Remote Delayed Offer S | Supported | | | |
| | | SBC Media Security Meth | SDES | | MSRP re-INVITE/UPDATE | Supported | | | |
| | | Reset SRTP Upon Re-key | Disable | | MSRP Offer Setup Role | ActPass | | | |
| | | Generate SRTP Keys Mode | Only If Required | | Remote Representation | According to One | ration Mode | | |

| Name | Parameter |
|---|--|
| | |
| General | |
| Name | SV9100 IP Profile (arbitrary descriptive name) |
| Media Security | |
| SBC Media Security Mode | Not Secured |
| SBC Signaling | |
| P-Asserted-Identity Mode | Add (required for anonymous calls) |
| SBC Forward and Transfer | |
| Remote Refer Mode | Handle Locally |
| Remote Replaces Mode | Handle Locally |
| Remote 3XX Mode | Handle Locally |
| All other parameters can be left unchanged at | their default values. |

Configure IP Groups

This section describes how to configure IP Groups. The IP Group represents an IP entity on the network with which the SBC communicates. This can be a server (e.g., IP-PBX or SIP Trunk) or it can be a group of users. For servers, the IP Group is typically used to define the server's IP address by associating it with a Proxy Set. Once IP Groups are configured, they are used to configure IP-to-IP routing rules for denoting source and destination of the call.

 Configure an IP Group for the SV9100. Navigate to SETUP > SIGNALING & MEDIA > CORE ENTITIES > IP Groups to create the group. For the SV9100 the IP Group will support a REGISTER from the SV9100.

| VERGE RYONN | | | | | | | ⊖ Ent | ity paramet | er val |
|------------------------------|----------------------|--|-----------------|-------------------------------|------------------|-----------------------|--------------------------|--------------|----------------|
| VERGE BA9000 | IPINETWORK SIGNALI | ADMINISTRATION | | | | | C End | ty, paramete | er, vai |
| SRD All | Ψ. | | | | | | | | |
| 10.0 | (0) (0) (0) | | | | | | _ | | |
| STOPOL | oups [Sv9100] | | | | | | | - × | |
| CORE ENTI | | | | | | | | | |
| SRDs (1) | | SRD | #0 | [DefaultSRD] | | | | | |
| SIP Interfac | | | | | | | | OUT | (BOUI SSAGE |
| Media Reali | GENERAL | | | QUALITY OF EXPERIENCE | | | | MAN | NIPUL |
| IP Groups (| Index | 1 | | OoE Profile | | | - View | -1 | |
| CODERS & | index | - | | QUE FIOINE | | | - | -1 | |
| | Name | • SV9100 | | Bandwidth Profile | | | View | -1 | |
| P Profiles (. Coder Setti | Topology Location | Down | ۲ | | | | | | |
| Coder Grou | Туре | Server | ٣ | MESSAGE MANIPULATION | | | | | |
| Allowed Au | Proxy Set | • #1 [5V9100] | ▼ View | Inbound Message Manipulati | on Set | -1 | | Eď | lit |
| Allowed Vid | IP Profile | #1 [SV9100 IP Profile] | ▼ View | Outhoused Messeer Messeule | | | | | - |
| SBC | Madia Paaloo | | - View | Outbound Message Manipula | ation Sec | -1 | | | |
| SIP DEFINIT | Weda Kealin | ** | | Message Manipulation User-D | Defined String 1 | | | | |
| MEGGAGEA | Internal Media Realm | - | ▼ View | Message Manipulation User-E | Defined String 2 | | | Vie | ew |
| MESSAGE I | Contact User | | | Proxy Keep-Alive using IP Gro | oup settings | Disable | • | Vie | ew |
| Message M | SIP Group Name | sv9100.necdemo.co.uk | | | | | | | |
| Message Pc | | | Cance | APPLY | | | | | |
| Pre-Parsing warm | ุ่มเล่นงาวชีเร (ง) | Media Realm | | View | Outbound M | Anna Man | | | |
| MEDIA | | Internal Media Realm | | View | Message Ma | anipulation | | | |
| | CTION | Contact User | | | Message Ma | anipulation | | | |
| INTRODICIN DETE | CHON | SIP Group Name • sv9100 | I.necdemo.co.uk | | Proxy Keep-A | Alive using I Disable | | | |
| | | Created By Routing Server No | | | | | | | |

| Name | Parameter |
|---|--|
| General | |
| Name | SV9100 (arbitrary descriptive name) |
| Topology Location | Down |
| Туре | Server |
| Proxy Set | SV9100 |
| IP Profile | SV9100 IP Profile |
| SIP Group Name | sv9100.necdemo.co.uk (change as per customer requirements) |
| SBC General | |
| Classify By Proxy Set | Enabled |
| SBC Registration and Authentication | |
| Authentication Mode | SBC as Server |
| Authentication Method List | REGISTER |
| Username | SV9100 (will be set in the SV9100) |
| Password | Choose a complex password (will be set in the SV9100) |
| All other parameters can be left unchanged at | their default values. |



2. Configure an IP Group for MS Teams. No registration is required with the MS Cloud PBX.

| NEC BX9000 | | | | | | | - 🗆 × |
|---------------------|----------------------|--|------------|--------------------------------------|---------------------|----------------------------|-----------------------|
| NEC | SETUP MONITOR TRO | | | | Save | Reset Actions - | , Admin - |
| UNIVERGE BX9000 | IP NETWORK SIGNALING | & MEDIA ADMINISTRATION | | | | ,⊖ Ent | ity, parameter, value |
| 🗢 🔶 SRD All | v | | | | | | |
| | oups [MS Teams] | | | | | | - × |
| CORE ENTI | | | | | | | |
| (DD= (1) | | | SRD #0 [De | efaultSRD] 🔻 | | | Q |
| SIP Interfac | | | | | | | OUTBOUND |
| Media Real | GENERAL | | | QUALITY OF EXPERIENCE | | | MESSAGE |
| Proxy Sets | GENERAL | | | gonerr or en enerce | | | SET |
| IP Groups (| Index | 2 | | QoE Profile | | ▼ View | 4 |
| > CODERS & | Name | MS Teams | | Bandwidth Profile | | ▼ View | -1 |
| ⊿ SBC | Topology Location | • Up | • | | | | |
| Classificatio | Туре | Server | • | MESSAGE MANIPULATION | | | |
| A Routing | Provy Set | a #2 [MS Teams] | ▼ View | | | | |
| Routing | noxy see | • #2(ins reality) | | Inbound Message Manipulation Set | -1 | | Edit |
| IP-to-IP | IP Profile | #2 [MS Teams IP Profile] | ▼ View | Outbound Message Manipulation Se | t -1 | | |
| Alternat IP Grou | Media Realm | | ▼ View | Message Manipulation User-Defined | String 1 | | |
| Manipula | Internal Media Realm | | ▼ View | Message Manipulation User-Defined | String 2 | | View |
| SBC Genera | Contact Liser | | | Provo Keen-Alive using IP Group sett | ings e Enable | • | View |
| Call Admiss | | | | Troxy reep sine daing in droup act | ings e chubic | | |
| External Me | SIP Group Name | | | _ | | | |
| | | | Cancel | APPLY | | | |
| F SIP DEFINITIONS | | Media Realm | | View O | utbound Message Ma1 | | |
| MESSAGE MANIP | ULATION | Internal Media Realm | | View | essage Manipulation | | |
| ▶ MEDIA | | Contact User | | М | essage Manipulation | | |
| | | Created By Politing Sector | No | Pr | • Enable | | |
| INTRUSION DETE | CTION | Created by Routing Server | NO | | | | |

| Name | Parameter |
|---|---|
| General | |
| Name | MS Teams (arbitrary descriptive name) |
| Topology Location | Up |
| Туре | Server |
| Proxy Set | MS Teams |
| IP Profile | MS Teams IP Profile |
| SBC General | |
| Classify By Proxy Set | Disabled |
| Advanced | |
| Local Host Name | sbc.necdemo.co.uk (change to customer requirements) |
| Always Use Src Address | Enabled |
| Message Manipulation | |
| Proxy Keep-Alive using IP Group settings | Enable |
| All other parameters can be left unchanged at | their default values. |



MS Teams requires the use of SRTP only. The SV9100 IP Profile has RTP enabled, so it is necessary for the SBC to encrypt the RTP Payload. To enable this option ensure that SETUP > SIGNALING & MEDIA > MEDIA > Media Security > Media Security is set to Enable.

| NEC BX9000 | | | | | - 🗆 × |
|--|----------------------------------|------------------|---|------------------------|--------------------|
| | BLESHOOT | | Save Reset | Actions - [| Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA ADMINISTRATION | | | 🔎 Entity, pa | rameter, value |
| 🔄 🔿 SRD All 🔻 | | | | | |
| C TOPOLOGY VIEW | Media Security | | | | |
| CORE ENTITIES | GENERAL | | AUTHENTICATION & ENCRYPTION | | |
| CODERS & PROFILES | Media Security | • Enable • | Authentication on Transmitted RTP Packets | Active | v |
| ⇒ SBC | Media Security Behavior | Preferable 🔻 | Encryption on Transmitted RTP Packets | Active | v |
| ▶ SIP DEFINITIONS | Offered SRTP Cipher Suites | All | Encryption on Transmitted RTCP Packets | Active | T |
| MESSAGE MANIPULATION | ARIA Protocol Support | Disable * | SRTP Tunneling Authentication for RTP | Disable | * |
| MEDIA | | | SRTP Tunneling Authentication for RTCP | Disable | · · |
| Media Security RTP/RTCP Settings | MASTER REY IDENTIFIER | | | | |
| Voice Settings Fax/Modem/CID Settings | Master Key Identifier (MKI) Size | 0 | | | |
| Media Settings | Symmetric MKI | Disable | | | |
| DSP Settings Quality of Experience | | | | | |
| INTRUSION DETECTION | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | Cancel | APPLY | | |
| | | | | | |

Security transcoding does not change the codec used, but encrypts the RTP payload using the keys exchanged in the Offer/Answer exchange.



Classification is used to classify incoming SIP dialog-initiating requests with a 'source' IP Group. This source IP Group is then used to route calls between different SIP entities.

The classification rules are more secure when Message Conditions are included. To create the necessary Classification Rules for MS Teams communication;

1. Navigate to SETUP > SIGNALING & MEDIA > MESSAGE MANIPULATION > Message Conditions. Add a new Message Condition with the following condition.

| NEC NEC BX9000 | | | | | | - | D X |
|--|---|---|--------------|-------------------------------------|----------------------|------------------|--------------------|
| | UBLESHOOT | | | Save Reset | Actions - | 4 <mark>.</mark> | Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING | & MEDIA ADMINISTRATION | | | | ⊖ Enti | ity, paramete | r, value |
| UNIVERGE BX0000 IP NETWORK SIGNALING SRD AII CODERS & PROFILES CODERS & PROFILES SRC SRC SRC SRC SRC Message Manipulations (0) Message Policies (1) Pre-Parsing Manipulation Sets (0) | MEDIA ADMINISTRATION Message Conditions (MS Teams-Co GENERAL Index Name Condition | 0 • MS Teams-Contact • header.contact.url.host.contains 'pstnhub.microsoft.com' | - X Edtor | NDITION Kder contact uri host co | D Ent | ty, paramete | C C |
| MEDIA INTRUSION DETECTION | | Cancel APPLY | | | | | |

| Parameter | Value |
|-----------|--|
| Name | MS Teams-Contact (arbitrary descriptive name) |
| Condition | header.contact.url.host contains 'pstnhub.microsoft.com' |



2. Navigate to *SETUP* > *SIGNALING* & *MEDIA* > *SBC* > *Classification*. Add a new Classification rule for MS Teams with the following conditions to allow known traffic to pass SBC security.

| | MONITOR TROUBLESHOOT | | | | | Save Reset Actions - | Admir |
|---------------------------------|------------------------------|------------------------|------------|----------------------------|-----------------|----------------------|--------------------------|
| UNIVERGE BX9000 | NETWORK SIGNALING & MEDIA | ADMINISTRATION | | | | Q | Entity, parameter, value |
| 📀 🅣 SRD All | Ŧ | | | | | | |
| TOPOLOGY VIEW | | Classification (1) | | | | | |
| CORE ENTITIES | | | | | | | P |
| CODERS & PROP | ncation | | | | | - | |
| ⊯ SBC | | | SRD #0 IDe | efaultSRDI 👻 | | | AB SV |
| Classification (1) Routing • | | | | | | | |
| Manipulation | MATCH | | | ACTION | | | |
| Call Admission C | Index | 1 | | Action Type | Allow | ~ | |
| Malicious Signati | Name | MS Teams | | Destination Routing Policy | 1.20 | • View | Edit |
| External Media S | Source SIP Interface | #1 [WAN SIP Interface] | • View | IP Group Selection | Source IP Group | × | |
| ▶ SIP DEFINITIONS | Source IP Address | 52.*.*.* | | Source IP Group | #2 [MS Teams] | ▼ View | |
| MESSAGE MANI | Source Transport Type | Any | × | IP Group Tag Name | default | | |
| IF MEDIA | Source Port | 0 | | IP Profile | | + View | View |
| INTRUSION DET | Source Username Pattern | × | | | | | Many |
| ▶ SIP RECORDING | Source Host | • | | | | | |
| | Destination Username Pattern | • | | | | | View |
| | Destination Host | sbc.necdemo.co.uk | | | | | |
| | | | Cancel | APPLY | | | |
| | | Message Condition | | View | | | |
| | | | | | | | |

| Parameter | Value |
|----------------------|--|
| Name | MS Teams (arbitrary descriptive name) |
| Source SIP Interface | WAN SIP Interface |
| Source IP Address | 52.*.* |
| Destination Host | sbc.necdemo.co.uk (setting as per customer SBC FQDN) |
| Message Condition | MS Team-Contact |
| Action Type | Allow |
| Source IP Group | MS Teams |



This section describes how to configure the necessary IP-to-IP Routing rules for communication between the SV9100 PBX and MS Teams Cloud PBX. These rules may vary depending on other functions of the SBC. As a minimum the rules below should be added or configured.

| NEC NEC BX9000 | | | | | | | | | | | | - 🗆 × |
|--|------------|------------------|------------------------------|---------------------------------|--|-------------------|-------------------------------|------------------------------------|--------------------------------|-------------------------|------------------------------|------------------------|
| | BLESHOOT | | | | | | | | Save | Reset A | ctions - | o Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING & | MEDIA AD | MINISTRATION | | | | | | | | | 🔎 Entity, par | ameter, value |
| SRD All | | | | | | | | | | | | |
| C TOPOLOGY VIEW | IP-to-IP R | outing (5) | | | | | | | | | | |
| | + New Ed | lit Insert 🛧 | ↓ 🖻 | 14 | <a 1<="" page="" td=""><td>of 1 IN IN Show</td><td>w 10 V records</td><td>; per page</td><td></td><td></td><td></td><td>Q</td> | of 1 IN IN Show | w 10 V records | ; per page | | | | Q |
| SBC | INDEX 🗢 | NAME | ROUTING POLICY | ALTERNATIVE ROUTE OPTIONS | SOURCE IP GROUP | REQUEST TYPE | SOURCE USERNAME PATTERN | DESTINATION USERNAME PATTERN | DESTINATION TYPE | DESTINATION IP GROUP | DESTINATION SIP INTERFACE | DESTINATION ADDRESS |
| Classification (1) | 0 | Terminate OPTI | Default_SBCRou | Route Row | Any | OPTIONS | * | * | Dest Address | | | internal |
| 4 Pouting | 1 | SV9100 REGISTE | Default_SBCRou | Route Row | SV9100 | REGISTER | * | * | All Users | | | |
| Routing Policies (1) | 2 | MS Teams REFE | Default_SBCRou | Route Row | Any | All | * | * | Request URI | MS Teams | | |
| IP-to-IP Pointing (5) | 3 | MS Teams > SV9 | Default_SBCRou | Route Row | MS Teams | All | * | * | IP Group | SV9100 | | |
| Alternative Reasons Set (0) | 4 | SV9100 > MS Te | Default_SBCRou | Route Row | SV9100 | All | * | * | IP Group | MS Teams | | |
| IP Group Set (0) | | | | | | | | | | | | |
| Manipulation | #0[Term | inate OPTION | S] | | | | | | | | | Edit |
| SBC General Settings | | | | | | | | | | | | |
| Call Admission Control Profile (0) | | | | | | | | | | | | |
| Malicious Signature (12) | GENERA | L | | | | | ACTION | | | | | |
| External Media Source (0) | Name | | Terminat | e OPTIONS | | | Destination | п Туре | Dest Addre | ss | | |
| | Alternati | ve Route Options | Route Ro | w | | | Destination | n IP Group | | | | View |
| SIP DEFINITIONS | | | | | | | Destination | n SIP Interface | | | | View |
| MESSAGE MANIPULATION | MATCH | | | | | | Destination | n Address | • internal | | | |
|) N5014 | Source II | Group | Any | | | View | Destination | n Port | 0 | | | |
| ▶ MEDIA | Request | Type | OPTIONS | | | | Destination | n Transport T | | | | 1 |
| INTRUSION DETECTION | Source L | Isername Pattern | * | | | | IP Group S | et | | | | View |
| | Source H | lost | * | | | | Call Setup | Rules Set ID | -1 | | | |
| | Source T | ag | | | | | Group Poli | cy | Sequential | | | |
| | Destigat | -o | * | | | | Cost Group | | | | | View |
| | Destinat | ion osername P | | | | | Routing Ta | g Name | default | | | |
| | Destinat | ion nost | | | | | | | | | | |

| Index | Name | Source IP Group | Request Type | Call Trigger | ReRoute IP Group | Dest Type | Dest IP Group | Dest Address | Function of this rule? |
|-------|----------------------|--------------------|--------------|-----------------|---------------------|-----------------|------------------|-----------------|---|
| 0 | Terminate OPTIONS | Any | OPTIONS | Any | Any | Dest Address | - | internal | This rule terminates received OPTIONS messages for received Keep-Alive messages |
| 1 | SV9100 REGISTER | SV9100 | REGISTER | Any | Any | All Users | - | - | This rule allows the SBC to respond to REGISTER messages from the SV9100 and authenticate based on the credentials in the IP Group settings |
| 2 | MS Teams REFER | Any | All | REFER | MS Teams | Request URI | MS Teams | - | This rule is used to allow MS Teams to transfer calls correctly |
| 3 | MS Teams > SV9100 | MS Teams | All | Any | Any | IP Group | SV9100 | - | This rule routes calls from MS Teams to the SV9100 Tie Trunk |
| 4 | SV9100 > MS Teams | SV9100 | All | Any | Any | IP Group | MS Teams | - | This rule routes calls from the SV9100 Tie Trunk to the MS Teams Cloud PBX |

Please review the necessary dial plan routing between MS Teams and the SV9100. Default routing rules are based on wildcard (*) entries, but these should be restricted to the customer dial plan.

MS Teams Configuration

Connect the SBC to Microsoft Direct Routing

NEC does not provide support for configuration of MS Teams components and the information provided in this section is for guidance only. Care should be taken to review the latest documentation and verify that the detailed commands are correct and appropriate for the MS Teams tenant.

For full documentation of Microsoft Direct Routing review the documentation here;

https://docs.microsoft.com/en-us/microsoftteams/direct-routing-landing-page

Much of the required setup is carried out using Microsoft PowerShell.

Download and install the Skype for Business Online Windows PowerShell Module from here;

https://www.microsoft.com/en-us/download/details.aspx?id=39366

Depending on your MS Teams configuration you will need to follow one of the methods below to connect to the MS Teams Tenant PowerShell session.

1. Connect to MS Teams using an administrator account name and password

```
Import-Module SkypeOnlineConnector
$userCredential = Get-Credential
$sfbSession = New-CsOnlineSession -Credential $userCredential
Import-PSSession $sfbSession
```

This method is used when the administrator account has multi-factor authentication disabled.

2. Connect to MS Teams using an administrator account with multi-factor authentication enabled.

```
Import-Module SkypeOnlineConnector
$sfbSession = New-CsOnlineSession
Import-PSSession $sfbSession
```

This method is used when MFA is enabled, you will need to verify your credentials by email or SMS service.

Create the SBC gateway

Validate the commands used to create the SBC gateway using this command;

Get-Command *onlinePSTNGateway*

These commands are used to manage the link to the customer on premise SBC.

| CommandType | Name | Version | Source |
|-------------|----------------------------|---------|------------------|
| | | | |
| Function | Get-CsOnlinePSTNGateway | 1.0 | tmp_v5fiu1no.wxt |
| Function | New-CsOnlinePSTNGateway | 1.0 | tmp_v5fiulno.wxt |
| Function | Remove-CsOnlinePSTNGateway | 1.0 | tmp_v5fiulno.wxt |
| Function | Set-CsOnlinePSTNGateway | 1.0 | tmp_v5fiulno.wxt |



Use the following command to connect the SBC to the tenant;

New-CsOnlinePSTNGateway -Identity sbc.necdemo.co.uk -Enabled \$true -SipSignalingPort
5061 -MaxConcurrentSessions 10

This command will create a SIP link to sbc.necdemo.co.uk:5061 and support a maximum of 10 concurrent calls.

You can verify the gateway is enabled using the following command;

Get-CsOnlinePSTNGateway -Identity sbc.necdemo.co.uk

Verify the link in the SBC Status pages

To verify the online status of the MS Teams connector, navigate to *MONITOR > VOIP STATUS > Proxy Sets Status*.

| NECC Strue MONITOR MONITOR MONITOR SRC MONITOR SRC MONITOR Proxy Sets Status PROXY Set Value MODE MONITOR PROXY Set Value PROXY Set Value MODE KEEP ALVE ADDRESS PRIORITY Weight Success PROXY Set Value MODE KEEP ALVE ADDRESS PRIORITY Weight Success ProxySet Status Success Falues ProxySet Status Success Falues VOIP Status Success Falues ProxySet Status Success Falues ProxySet Status Registration Status Registration Status | NEC SUN MUNITOR ROUNTOR COLUMNA Attorn COLUMNA COLUMNA <th< th=""><th>NEC BX9000</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>-</th><th></th></th<> | NEC BX9000 | | | | | | | | | - | |
|---|---|-------------------------|------------|------------|----------------|------------|--|----------|--------|----------------------|--------------------|--------------------|
| MONITOR Proxy Sets Status Proxy Sets Status MODE KEEP ALVE All COUNT France Count Submark VOIP STATUS VOIP STATUS 1 SV9100 Parking Disabled And Non Non Non 2 MS Teams Load Balancing Enabled 192 168 88 160:5062/41 - - -285 0 ONLINE 2 MS Teams Load Balancing Enabled - - -285 0 ONLINE 2 MS Teams Load Balancing Enabled - - -285 0 ONLINE | NUMBER DE DOOD NOMITOR Image: contract de la contr | | | | | | | Save | Reset | Actions - | ۰ ل <mark>ہ</mark> | Admin - |
| PROVINCR Proxy Sets Status Proxy Sets Status Proxy Sets Status Proxy Sets Status France | Image: Status Status | UNIVERGE BX9000 MONITOR | | | | | | | | Q | Entity, paran | neter, value |
| MONITOR Proxy Sets Status This page refreshes every 60 seconds > DERFORMANCE MONITORING NAME MODE KEEP ALIVE ADDRESS PRIORITY WEIGHT SUCCESS FAILURE STATUS > VOIP STATUS 0 ProxySet_0 Parking Disabled Inc Inc NOT | Image: Nontroe Proxy Sets Status This page refreshes every 60 seconds Image: VollP STATUS PROPY Set Status This page refreshes every 60 seconds Image: VollP STATUS Sec Registered Users Proxy Set Status Total Country VeliGHT Submark Country Registration Status Sec Core History Sig2 pstrhlub microsoft.com/S2.114.75.24.5061(*) - - 2.278 O ONLINE Image: VollP STATUS Sig2 pstrhlub.microsoft.com/S2.114.72.44.5061(*) - - 2.278 O ONLINE Image: VollP Status Sig2 pstrhlub.microsoft.com/S2.114.72.44.5061(*) - - 2.278 O ONLINE Image: VollP Status Sig2 pstrhlub.microsoft.com/S2.114.72.44.5061(*) - - 2.278 O ONLINE Image: VollP Status Sig2 pstrhlub.microsoft.com/S2.114.72.44.5061(*) - - 2.78 O ONLINE Image: VollP Status Sig2 pstrhlub.microsoft.com/S2.114.72.44.5061(*) - - 2.78 O ONLINE | ← → SRD All ▼ | | | | | | | | | | |
| Image: Nonlog Proxy Sets Status This page refreshes every 60 seconds > SUMMARY PERFORMANCE MONITORING NAME MODE KEEP ALVE ADDRESS PRIORITY WEIGHT SUCCESS COUNT STATUS > VOIP STATUS SBC Registered Users 1 Sv9100 Parking Disabled Image: Count of the second s | Image: Nontrol Proxy Sets Status > DUMMARY PERFORMANCE MONITORING Nontrol Note Status Set Registration Status Set Registration Status Set Registration Status Set COR History - - 200 ONLINE - 200 ONLINE - - 000 ONLINE 0 | | | | | | | | | | | |
| PERFORMANCE MONITORING NAME MODE KEEP ALIVE ADDRESS PRIORITY WEIGHT SUCCESS COUNT FAILURE COUNT STATUS ✓ VOIP STATUS OP roxySet_0 Parking Disabled OP stabled Image: Count of the stabled Note | SUMMARY PERFORMANCE MONITORING NAME MODE KEEP ALIVE ADDRESS PRIORITY WEIGHT SUCCESS FAILURE VOIP STATUS SEC Registered Users 0 ProxySet_0 Parking Enabled 10 10 10 10 Resource 0001100000000000000000000000000000000 | | Proxy Sets | Status | | | This page refreshes every 60 seconds | | | | | |
| P PERORMANCE MONITORING Indianal NAME MODE KEEP ALIVE ADDRESS PRIORITY Weight COUNT COUNT Status I VOIP STATUS 0 ProxySet_0 Parking Disabled Image: Count of the status Image: | PERFORMANCE MONITORING INAME MODE KEEP ALIVE ADDRESS PRIORITY WEIGHT OCUMT STATUS I OUP STATUS SEC Registered Users 0 ProxySet_0 Parking Disabled Inc. Inc. Inc. NAME NOTE NOTE SEC Registered Users 1 SV9100 Parking Enabled Inc. Inc. Inc. Inc. Inc. ONLINE ProxySets Status SEC CDR History Inc. ONLINE NETWORK STATUS Inc. | ▶ SUMMARY | PPOYV SET | | | | , , | | | SUCCESS | EAULIDE | |
| Image: Note Status O ProxySet_0 Parking Disabled Disabled Not Not SIG: Registrated Users Not Not Not Not Status Not Not Not Not Not Not Not Not Not Not Not Not Not Not Not Not Not | Image: Nort Status O ProxySet_0 Parking Disabled Image: Nort Status Nort Status Nort Status Nort Status Nort Status SEC CoR History Image: Nort Status Image: Nort Nort Status Image: Nort N | PERFORMANCE MONITORING | ID | NAME | MODE | KEEP ALIVE | ADDRESS | PRIORITY | WEIGHT | COUNT | COUNT | STATUS |
| SBC Registered Users 1 SV9100 Parking Enabled 192 168 88 160:5062(*) - - - - O ONLINE Proxy Sets Status 192 168 88 160:5062(*) - - - - - 0 ONLINE Registration Status - - - - - - - 0 ONLINE | SBC Registered Users 1 SV9100 Parking Enabled 192168 88 160 5062(**) - - 2 26 ONLINE Proxy-Sets Status Registration Status SBC COR History 1 1 AS Teams Load Balancing Enabled 192168 88 160 5062(**) - - 27.5 ONLINE SBC CDR History 2 MS Teams Load Balancing Enabled sip pstnhub.microsoft.com/52.114.132.46508(*) - - 27.9 0.0 ONLINE NETWORK STATUS - - - - - - - - 0.0 ONLINE | VOIP STATUS | 0 | ProxySet_0 | Parking | Disabled | | | | | | NOT RESOLVED |
| Proxy Sets Status 102 168 88 160 5062/*1 - - - 285 O ONLINE Registration Status 2 MS Teams Load Balancing Enabled isip.psth/hub.microsoft.com(52.114.75.24.5061)(*) - - 279 10 ONLINE | Proxy Sets Status Registration Status SBC CDR History 2 MS Teams Load Balancing Enabled Image: Comparison of Status St | SBC Registered Users | 1 | SV9100 | Parking | Enabled | | | | | | ONLINE |
| Registration Status Z WIS Teams Code balancing Penaled Registration Status - 2.279 1 ONLINE | Registration Status SBC COR History 2 ws reams Code Selenting Pint Pint Pint Pint Pint Pint Pint Pint | Proxy Sets Status | 2 | MC Teams | Load Delensing | Enabled | 192 168 88 160:5062(*) | | | 285 | 0 | ONLINE |
| | SEC CDR History sip2.psthhub.microsoft.com(52.114.132.465.061) - 279 0 ONLINE > NETWORK STATUS sip3.psthhub.microsoft.com(52.114.7.24.5061)(*) - - 278 0 ONLINE | Registration Status | 2 | MIS Teams | LOAD Balancing | Enabled | sip pstrpbub microsoft com/52 114 75 24-5061)(*) | | | 279 | 1 | ONLINE |
| SBC CDR History sip2.psthub.microsoft.com(52.114.132.46.5061) | NETWORK STATUS - - 2/9 0 OLLNE | SBC CDR History | | | | | sip2.pstnhub.microsoft.com(52.114.132.46:5061) | | | 070 | | 011111 |
| (*) 2/9 0 UNLINE | sip3.psthub.microsoft.com(52.114.7.24:5061)(*) - 278 0 ONLINE | NETWORK STATUS | | | | | (*) | | | 2/9 | U | UNLINE |
| sip3.psthhub.microsoft.com(52.114.7.24:5061)(*) 278 0 ONLINE | | | | | | | sip3.pstnhub.microsoft.com(52.114.7.24:5061)(*) | - | - | 278 | 0 | ONLINE |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

You can also see the status of the IP Group in SETUP > SIGNALING & MEDIA > TOPOLOGY VIEW.



Orchestrating a brighter world

Enable the users for Enterprise Voice and assign on premise PSTN number

To enable the MS Teams user for voice, ensure that they have a license assigned which includes Teams (i.e. E1, E3, E5) plus the Microsoft Phone System license.

** Please be aware this license can take several hours to allocate – during testing it took more than 6 hours between allocating in the administration centre and activation.

Using PowerShell issue the following command;

Set-CsUser -Identity "<User name>" -EnterpriseVoiceEnabled \$true -HostedVoiceMail \$true -OnPremLineURI tel:<E.164 phone number>

For example;

Set-CsUser -Identity "dave.smith@necdemo.co.uk" -OnPremLineURI tel:+441159695700 EnterpriseVoiceEnabled \$true -HostedVoiceMail \$true

This must be the full E.164 formatted number. For more information see <u>https://www.itu.int/rec/T-REC-</u> E.164-201011-I/en

Configure Voice Routing Create the PSTN Usage

In this example only a single usage is created. For more complex plans see Microsoft documentation. Using PowerShell create a PSTN Usage called 'NEC' using this command;

Set-CsOnlinePstnUsage -Identity Global -Usage @{Add="NEC"}

Verify this is created using this command;

(Get-CsOnlinePstnUsage).usage

Create an Online Voice Route

The Online Voice Route is a regex pattern which matches a dialled number to the PSTNGateway and PSTN Usage. In this example there is a single Online Voice Route called 'NEC SBC' which matches all dialled digits (.*), is linked to the PSTN Gateway 'sbc.necdemo.co.uk' and PSTN Usage called 'NEC'.

```
New-CsOnlineVoiceRoute -Identity "NEC SBC" -NumberPattern ".*" -
OnlinePstnGatewayList sbc.necdemo.co.uk -Priority 1 -OnlinePstnUsages "NEC"
```

You can verify this using the command;

Get-CsOnlineVoiceRoute

| ł | Identity | : | NEC SBC |
|---|-----------------------|---|---------------------|
| | Priority | | 1 |
| 1 | Description | | |
| ł | NumberPattern | | .* |
| k | DnlinePstnUsages | | {NEC} |
| k | OnlinePstnGatewayList | | {sbc.necdemo.co.uk} |
| l | Name | | NEC SBC |



Create a new Voice Routing Policy

The Voice Routing Policy is used to link a user to the Online Voice Route. Again in this example there is a single Policy called 'NEC SBC' and links to PSTN Usage 'NEC' using this command;

New-CsOnlineVoiceRoutingPolicy "NEC SBC" -OnlinePstnUsages "NEC"

You will see confirmation of the new routing policy as below;

| Identity | : | Tag:N | EC SBC | | | |
|------------------|---|-------|--------|------|-----|--------|
| OnlinePstnUsages | : | {NEC} | | | | |
| Description | : | | | | | |
| RouteType | : | BYOT | (Bring | Your | Own | Trunk) |

The final step is to assign this policy to our users. This can be done with this command;

Grant-CsOnlineVoiceRoutingPolicy -Identity "dave.smith@necdemo.co.uk" -PolicyName
"NEC SBC"

And this can be verified with the following command;

Get-CsOnlineUser "dave.smith@necdemo.co.uk" | select OnlineVoiceRoutingPolicy

PS C:\Users\apage> Get-CsOnlineUser "dave.smith@necdemo.co.uk" | select OnlineVoiceRoutingPolicy_ OnlineVoiceRoutingPolicy ------NEC SBC

SV9100 Configuration

IP Trunk Setup

Using the PCPro application complete the following steps to setup a Tie-line trunk to the BX Series SBC. This example is based on using SIP Trunking Profile 2, and assuming the customer may already have IP Trunks directly connected using IP Profile 1. If you want to use IP Profile 1 you will need to adjust the settings in this section.

1. Create SIP Trunks for the interconnection. In *Advanced Items + VoIP + Networking + SIP Trunks + SIP Trunks Assignment* assign the trunks. Ensure that you have the correct number of IP Trunk licenses installed before completing this step.

| File Home View Reports Filter options Tools Grid style 🛛 🕂 Ribbon search | A 🚸 About |
|---|-------------------|
| | |
| Apply Copy Paste Fill Default Group Column Filter Expand Contract Save Default Installed Page | |
| | |
| | |
| Search Search Setting No. Trunk Type Start Ports | |
| | |
| 00 02 SIP 73 8 | |
| 00 03 None 0 0 | |
| 00 04 None 0 0 | |
| 00 05 None 0 0 | |
| 00 06 None 0 0 | |
| Programming Level 00 07 None 0 0 | |
| | |
| 00 09 None 0 0 | |
| Advanced tems A 00 10 None 0 0 | |
| ACD Automatic Call Distribution 01 01 None 0 0 | |
| The Lines 01 02 None 0 0 | |
| Hotel 01 03 None 0 0 | |
| VolP 01 04 None 0 0 | |
| General Settings 01 05 None 0 0 | |
| QoS Settings 01 05 None 0 0 | |
| Extensions 01 07 None 0 0 | |
| Networking 01 08 None 0 0 | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| 1 SIP Tanks - Carrier Mode //P Addres 02 06 None 0 0 | |
| SIP Trurks - Canter Mode (Domain N 02 07 None 0 0 | |
| IPLE Video Features 02 08 None 0 0 | |
| IP DECT 09 None 0 0 | |
| Service Tones 02 10 None 0 0 | |
| User Pro 03 01 None 0 0 | |
| Maintenance 03 01 None 0 0 | |
| | |
| SNMP 03 04 Nore 0 0 | |
| 1 1 1 NTP 03 05 Nove 0 0 | |
| > 03 06 None 0 0 | |
| Exercised AM Conference AM 03 07 None 0 0 | |
| Capania ne Longue ne Casa Casa Casa Casa Casa Casa Casa Cas | |
| KasyEdit C System Data 03 09 None 0 0 | ~ |
| Done User tech (IN) <u>Site: (* 1967 vers 599100 CP20 EM</u> | A Chassis Ver: 11 |

2. Assign the SIP trunks to IP Profile 2.

| ======================================= | | Easy ed | lit M | S Teams SV9 | 100 Configuration File [SV9 | 100 CP20 EMEA V10.5] - F | PCPro | - 0 | × |
|--|------------|---|------------------|-------------|-----------------------------|--------------------------|-------------------|--|---------|
| File Home View Reports Filter optic | ons Tools | Grid style | Actions | Ribbon se | arch | | | * 🔇 | About |
| Apply Copy Paste Fill Default Group Coll | umn Filter | Used: 1 I I I I I I I I I I I I I I I I I I | ✓ Used ↓ Type | * | Save Default Installed | Page help | * * | | |
| Main Edit Advanc | ed view | Grouping | Companion | columns | Page view | Easy edit page | help | | |
| EasyEdit # × Search Q | Trunk | Trunk Name | IP Trunk Type | System ID | P2P Mode Video I | Node SIP Profile | | | Ŷ |
| | 058 | Line 058 | None | 0 | | Profile 1 | | | |
| ^ | 059 | Line 059 | None | 0 | | Profile 1 | | | |
| | 060 | Line 060 | None | 0 | | Profile 1 | | | |
| × | 061 | Line 061 | None | 0 | | Profile 1 | | | |
| | 062 | Line 062 | None | 0 | | Profile 1 | | | |
| | 063 | Line 063 | None | 0 | | Profile 1 | | | |
| Programming Level | 064 | Line 064 | None | 0 | | Profile 1 | | | |
| | 065 | SIP 1 | SIP | 0 | | Profile 1 | | | |
| C Aturnations | 066 | SIP 2 | SIP | 0 | | Profile 1 | | | |
| Advanced items | 067 | SIP 3 | SIP | 0 | | Profile 1 | | | |
| The lines | 068 | SIP 4 | SIP | 0 | | Profile 1 | | | |
| He dies | 069 | SIP 5 | SIP | 0 | | Profile 1 | | | |
| - E VolP | 070 | SIP 6 | SIP | 0 | | Profile 1 | | | |
| General Settings | 071 | SIP / | SIP | 0 | | Profile 1 | | | |
| QoS Settings | 072 | SIP 8 | SIP | 0 | | Proble 1 | | | |
| - Extensions | 073 | SIP P2 1 | SIP | 0 | | Profile 2 | | | |
| Networking | 074 | SIF FZ Z | CID | 0 | | Profile 2 | | | |
| - NetLink | 075 | SIF F2 3 | SIF | 0 | | Profile 2 | | | |
| AspireNet CVM | 076 | SIF F2 4 | SIF | 0 | | Profile 2 | | | |
| I K-CCIS | 079 | SIF FZ 3 | CID | 0 | | Profile 2 | | | |
| E SIP Trunks | 070 | SIF FZ 0 | CID | 0 | | Profile 2 | | | |
| SIP Trunks Assignment | 020 | SIF F2 / | SIF | 0 | | Profile 2 | | | |
| SIP Trunks Data Setup | 000 | 511 1 2 0 | JIF | | | Profile 2 | | | |
| SIP Trunks General Settings SIP Trunks Vietworking Mode | 092 | Line 092 | None | ů. | E i | Profile 1 | | | |
| SIF Tranks - Networking Hode SIF Tranks - Carter Mode (IP Addres | 092 | Line 092 | None | 0 | | Profile 1 | | | |
| SIP Trunks - Carrier Mode (Domain N | 084 | Line 084 | None | 0 | | Profile 1 | | | |
| IPLE Video Features | 085 | Line 085 | None | ő | E i | Profile 1 | | | |
| IP DECT | 086 | Line 086 | None | ő | | Profile 1 | | | |
| Service Tones | 087 | Line 087 | None | ñ | i ii | Profile 1 | | | |
| User Pro | 088 | Line 088 | None | 0 | i i i | Profile 1 | | | |
| Maintenance | 089 | Line 089 | None | 0 | i i | Profile 1 | | | |
| | 090 | Line 090 | None | õ | | Profile 1 | | | |
| | 091 | Line 091 | None | 0 | i i | Profile 1 | | | |
| <u></u> | 092 | Line 092 | None | 0 | i i | Profile 1 | | | |
| < > | 093 | Line 093 | None | 0 | i i | Profile 1 | | | |
| Evoand All Collapse All | 094 | Line 094 | None | 0 | i i | Profile 1 | | | |
| Expand Air Collapse Air | 095 | Line 095 | None | 0 | i i | Profile 1 | | | |
| 🖎 EasyEdit 📢 System Data | 096 | Line 096 | None | 0 | | Profile 1 | | | ~ |
| Done | | | | | | | User: tech (IN) S | ite: 🗧 😽 File Ver: SV9100 CP20 EMEA Chassis Ver: 1 | 1 🖸 🗋 🕫 |

3. Modify the SIP Customisation Options for Profile 2 in Advanced Items + VoIP + Networking + SIP Trunks + SIP Trunks General Settings + SIP Trunks Message Customization.

| 🗐 🔒 🚨 📭 🦊 🛉 💷 🖉 🥅 T | Easy edit MS Teams SV9100 Configuration File (SV9100 CP20 EME | A V10.5] - PCPro | - 🗆 X |
|---|--|--|---|
| File Home View Reports Filter option | s Tools Grid style Actions Q Ribbon search | | About 🔅 |
| Apply Copy Paste Fill Default cell Advanced | nn Filter Dande Contract er bar all all Companion columns Companion columns Companio | 94-39 | |
| EasyEdit $\Psi 	imes$ | | | |
| Search | | Profile 2 | |
| · · · · · · · · · · · · · · · · · · · | Ontion 1: Incoming IND/ITE Measures CLIP Service | Made O'Llee Default Caster Made Value | |
| | Ontion 2: Outpring INVITE Message Contact Header User Part | Mode 5: Lee Extension Caling Party Information | |
| | Ontion 3: Outgoing INVITE Message EBOM Header Liser Part | Mode 4-Lise Extension Calling Party Information | |
| | VILLEA VILLENDE NESSEE EDVILLEADER UND AV FAIL | More to use detail to aner white value | |
| ~ | Option 5: Outgoing INVITE Message P-Asserted-Identity/P-Preferred-Identity Usage | Node 0:Use Default Carrier Mode Value | |
| | Option 6: Re-INVITE without SDP Behaviour | Mode 0:Use Default Carrier Mode Value | |
| Programming Level | Option 8: Re-INVITE for Hold Behaviour | Mode 0:Use Default Carrier Mode Value | |
| | Option 9: Outgoing Call INVITE Message | Mode 0:Both different. | |
| | Option 10: INVITE without SDP Behaviour | Mode 0:Use Default Carrier Mode Value | |
| Advanced Items | Option 12: REGISTER behaviour making calls when Registered | Mode 0: Reject the outgoing call. | |
| ACD Automatic Call Distribution | Option 13: INVITE Request-URI Transport Behaviour | Mode 0:Use Default Carrier Mode Value | |
| Tie Lines | Option14: CANCEL Request-URI Transport Behaviour | Mode 0:Request-URI in Cancel match. | |
| | Option 15: Incoming INVITE CLIP Behaviour | Mode 0:Use Default Carrier Mode Value | |
| | Option 16: 302 Moved Temporarily Message Contact Header Host Part Value | Mode 0:Use default carrier mode value. | |
| | Option 17: Outgoing INVITE Message FROM Header URI-Parameter Part | Mode 0:Use Default Carrier Mode Value | |
| | Option 18: Outgoing SIP Message DNS Resolution Behaviour | Mode 0:Use Default Carrier Mode Value | |
| | Option 19: Outgoing INVITE Message PRIVACY Header Behaviour | Mode 0:Use Default Carrier Mode Value | |
| - F NetLink | Option20: Outgoing INVITE Message P-Preferred-Identity/P-Asserted-Identity URI-Parameter Part | Mode 0:Use Default Carrier Mode Value | |
| AspireNet CVM | Option21: Re-REGISTER Time Interval | 0 | |
| I K-CCIS | Option22: G.729 Annexb Parameter in SDP Message | Mode 0:Do not include a=annexb in SDP message. | |
| E SIP Trunks | Option 23: Outgoing Invite Message For System Interconnection Profile/Dial number Usage | Mode 0: The destination SIP IP address is determined by dial number hierar | |
| 🖸 SIP Trunks Assignment | Option24: 302 Moved Temporarily Message Diversion Header Usage | Mode 0: Does not add the Diversion Header in 302 response. | |
| SIP Trunks Data Setup | Option25: SIP Registration Redundancy | Mode 0:Use default carrier mode value. | |
| El SIP Trunks General Settings | Option26: Add algorithm=MD5 into the authentication header | Mode U:Default setting (MD5 not included in authentication Header) | |
| SIP Trunks Basic Settings | Option27: Unange display name 'Anonymous' to 'anonymous' when calling party number is withheld | Mode u:Anonymous with a capital 'A' | |
| SIP Trunks CODEC Settings | Option 20: invite SUP regotiation Local/Hemote Priority Behaviour | Mode U:Deraut setting - Local SUP takes monty in negotiation. | |
| SIP Tranks Fold Settings | Option29: Outgoing Invite From Header User Part when using CLIR Option20: Outgoing Invite From Header Direlay Part when using CLIP | Mode U: Anonymous used in User Part. | |
| SIP Trunks Incoming Line Type | Option 30: Outgoing invite from neader Display Fait When Using CLIN | Mode U: Anonymous used in Usplay Part. | |
| SIP Trunk Call Divert | Option 21: SIR Division Header Beld "Line" Division Value | Mode 0. Anonymous used in Oser Fall. Mode 0. Lee default earlier mode value | |
| I SIP Trunks E.164 Number Forma | Ontion 32: SIP Privary Header Field 'Ortical' Privary Value | Mode 0:Use default carrier mode value. | |
| SIP Trunks TLS Settings | Ontion 34: SIP Privacy Header Field "Screen" Remote Party ID | Mode 0: Use default carrier mode value | |
| SIP Trunks Message Customizat | Ontion 35: DNS SRV Behaviour following NAPTR Response | Mode 0:Use Default Carrier Mode Value | |
| ISIP Trunks - Networking Mode | Oction 36: Sending RTP Packet Transmission Delay Timer | 0 | |
| SIP Trunks - Carrier Mode (IP Addres 🗸 | Option 37: CODECs listed in SDP of T 38 Re-Invite Message | Mode 0: Includes audio capability priority selection only | |
| < >> | Option 39: Send NU tone when 404 not found is received from the SIP Carrier | Mode 0: Use Default Carrier Mode Value | |
| Emand All College All | Option41: From Header SIP-URI setting for Outgoing Invite Messages when CLIR used | Mode 0: User Part @ IP address or Domain is set in this field | |
| Cupano Air Collapse Air | Option42: Diversion Header included in Outgoing Invite Messages | Mode 0: Does not add the Diversion Header in Invite message. | |
| EasyEdit System Data | Option43: Inclusion of torp parameter in SIP-URI for Outgoing Invite Messages | Mode 0: Not add torp parameter | |
| | | | |
| Done | | User: tech (IN) Site: | The Ver: SV9100 CP20 EMEA Chassis Ver: 10 |

| | Profile 2 |
|--|--------------------------------------|
| Option 2: Outgoing INVITE Message Contact Header User Part | Mode 2:Use Calling Party Information |
| Option 3: Outgoing INVITE Message FROM Header User Part | Mode 1:Use Calling Party Information |
| Option 4: Outgoing INVITE Message FROM Header Display Part | Mode 2:Use Calling Party Information |

4. Configure the SIP Host, Domain and Transport Protocol for Profile 2 with your customer information in Advanced Items + VoIP + Networking + SIP Trunks + SIP Trunks - Carrier Mode (IP Address) + SIP Carrier Mode (IP Address) - System Information Setup.





 Configure the SIP Server connection to the SBC. Replace the IP address with the LAN IP address of the BX SBC in Advanced Items + VoIP + Networking + SIP Trunks + SIP Trunks - Carrier Mode (IP Address) + SIP Carrier Mode (IP Address) - Server Setup. Ensure that Register Mode is set to Manual.

| 1 1 🚔 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Easy edit | MS Teams SV9 | 100 Configuratio | on File [SV9100 | CP20 EMEA V1 | 0.5] - PCPro | | | - 🗆 × |
|---|--|---|---|--|---|--|--|--------------------------------------|---------------------|
| F Home View Reports Filter optio | ons Tools Grid style Actions | Q_Ribbon se | arch | | | | | | A 💸 About |
| Apply Copy Paste Fill Default Copy Copy Paste Fill Default Cell by choo | mn Filter oser bar | Q | Save Default | Installed equipment | Page help | 29 14 | * | | |
| Main Edit Advance | ed view Grouping Compani | on columns | Page v | iew | Easy edi | t page help | | | |
| EasyEdit # × Search Q | | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | | |
| | Outbound Default Proxy Inbound Default Proxy Default Proxy IP Address Default Proxy Port Register Mode Registrar IP Address Bensfarre Port | 0.0.0.0 5060 None 0.0.0.0 5060 | 192.168.88.5 5060 Manual 192.168.88.5 5060 | 0.0.0.0 5060 None 0.0.0.0 5060 | 0.0.0 5060 None 0.0.0 5060 | 0.0.0.0 5060 None 0.0.0.0 5060 | 0.0.0.0 5060 None 0.0.0.0 5060 | | |
| Programming Level | Registral Folice Registration Expiry Time Register Sub Mode | Carrier B 3600 | Default 1800 | Default B600 | Default 3600 | Default 3600 | 3600 Default 3600 | | |
| | Keep Alive by OPTION message Keep Alive by OPTION Interval Timer Keep Alive by OPTION Fail Limit Option Keep Alive User ID Authentication Trial | 180 1 ping 1 | 180 1 ping 1 | 180 1 bing 1 | 180 1 ping 1 | 180 1 ping 1 | 180 1 ping 1 | | |
| Extensions Extensions Networking NetLink NetLink CVM DF KCCIS | MAC Address NAT Router NAPT Router IP Address Call Forward Moved Temporanly Support | 0.0.0.0 00-00-00-00 Not used 0.0.0.0 Disabled | 0.0.0.0 00-00-00-00 Not used 0.0.0.0 Disabled | 0.0.00 00-00-00-00 Not used 0.0.0.0 Disabled | 0.0.0.0 00-00-00-00 Not used 0.0.0.0 Disabled | 0.0.00 00-00-00-00 Not used 0.0.0.0 Disabled | 0.0.00 00-00-00-00 Not used 0.0.0.0 Disabled | | |
| SIP Tranks SIP Tranks Assignment SIP Tranks Data Setup SIP Tranks Cheres Settings SIP Tranks - Canter Mode (IP Address) - SIP Tranks - Canter Mode (IP Address) - SIP Canter Mode (IP Add | | | | | | | | | |
| KasyEdit 💙 System Data | <u> </u> | | | | | | | | |
| Done | | | | | | User | tech (IN) | Site: 🗧 😽 File Ver: SV9100 CP20 EMEA | Chassis Ver: 11 🗾 💡 |

6. Configure the SIP Registration account defined in the SV9100 IP Group on the SBC. Add your credentials in Advanced Items + VoIP + Networking + SIP Trunks + SIP Trunks - Carrier Mode (IP Address) + SIP Carrier Mode (IP Address) - Primary Authentication Information





7. Set your CPN to display the number sent towards MS Teams. For example this could be the extension number, or it may include branch office access codes (for redial). This item must be set!

| 🗐 🔒 🚢 ↦ 🦊 🕇 💷 🖉 🧊 T | | Easy ec | lit M | /IS Teams SV9100 Configuration F | ile [SV9100 CP20 EMEA V10.5] - P | CPro | | | – 🗆 × |
|---|--------------|--|-----------|----------------------------------|--|------------------------------|-------------------------|-------------------------------|-------------------------|
| File Home View Reports Filter optio | ins Tools | Grid style | Actions | Ribbon search | | | | | 🔺 💝 About |
| Apply Copy Paste Fill Cell Group Columbia | imn Filter E | Used:1 Tope: 00 Tope: Tope: 01 Tope: 01 Top | ✓ Used | Save Default In state ec | Image: Second | * * | | | |
| Main Edit Advance | ed view | Grouping | Companion | columns Page view | Eary edit page | help | | | |
| EasyEdit 🛛 🖓 🗙 | Station | | | SIP Extension - Calling Party | SIP Extension - Calling Party | IP Extension - Calling Party | SIP Extension - Calling | SIP Extension - Calling Party | SIP Extension - Calling |
| Search Q | Port | Extension | Name | Number Profile 1 | Number Profile 2 | lumber Profile 3 | Party Number Profile 4 | Number Profile 5 | Number Profile 6 |
| | 001 | 200 | EXT 200 | | 200 | | | | |
| ~ | 002 | 201 | EXT 201 | | 201 | | | | |
| | 003 | 202 | EXT 202 | | 202 | | | | |
| | 004 | 203 | EXT 203 | | 203 | | | | |
| | 005 | 204 | EXT 204 | | 204 | | | | |
| | 006 | 205 | EXT 205 | | 205 | | | | |
| Programming Level | 007 | 206 | EXT 206 | | 206 | | | | |
| | 008 | 207 | EXT 207 | | 207 | | | | |
| | 009 | 208 | EXT 208 | | 208 | | | | |
| Advanced Items | 010 | 209 | EXT 209 | | 209 | | | | |
| ACD Automatic Call Distribution | 011 | 210 | EXT 210 | | 210 | | | | |
| Tie Lines | 012 | 211 | EXT 211 | | 211 | | | | |
| - Hotel | 013 | 212 | EXT 212 | | 212 | | | | |
| | 014 | 213 | EXT 213 | | 213 | | | | |
| General Settings | 015 | 214 | EXT 214 | | 214 | | | | |
| Uos Settings | 016 | 215 | EXT 215 | | 215 | | | | |
| Extensions | 017 | 216 | EXT 216 | | 216 | | | | |
| A Netlink | 018 | 217 | EXT 217 | | 217 | | | | |
| AspireNet CVM | 019 | 218 | EXT 218 | | 218 | | | | |
| TEL K-CCIS | 020 | 219 | EXT 219 | | 219 | | | | |
| SIP Tanks | 021 | 220 | EXT 220 | | 220 | | | | |
| SIP Trunks Assignment | 022 | 221 | EXT 221 | | 221 | | | | |
| SIP Trunks Data Setup | 023 | 222 | EXT 222 | | 222 | | | | |
| SIP Trunks General Settings | 024 | | | | | | | | |
| ···· I SIP Trunks - Networking Mode | 025 | | | | | | | | |
| SIP Trunks - Carrier Mode (IP Addres | 026 | | | | | | | | |
| SIP Carrier Mode (IP Address) - S | 027 | | | | | | | | |
| SIP Carrier Mode (IP Address) - 5 | 028 | | | | | | | | |
| SIP Canter Mode (IP Address) - F | 029 | | | | | | | | |
| SIP Carter Mode (IP Address) - N | 030 | | | | | | | | |
| SIP Carrier Mode (IP Address) - C | 031 | | | | | | | | |
| SIP Carrier Mode (IF Address) - C | 032 | | | | | | | | |
| I SIP Tanks - Carter Mode (Domain N | 033 | | | | | | | | |
| IPI F Video Features | 034 | | | | | | | | |
| | 035 | | | | | | | | |
| · · · · · · · · · · · · · · · · · · · | 036 | | | | | | | | |
| Expand All Collapse All | 037 | | | | | | | | |
| | 038 | | | | | | | | ~ |
| 🕆 EasyEdit 💙 System Data | < | | | | | | | | > |
| Done | | | | | | User: tech (IN) Site: | | File Ver: SV9100 CP20 E | MEA Chassis Ver: 11 🔽 |

8. Configure DTMF support for the SIP tie-line in Advanced Items + VoIP + Networking + SIP Trunks + SIP Trunks General Settings + SIP Trunks DTMF Settings.

| ▋ | Easy e | dit MS Teams SV9100 Configura | ation File [SV9100 CP20 EMEA V10.5] - PCPro | | - 🗆 × |
|---|--|--|---|--------------------|--|
| F Home View Reports Filter optic | ons Tools Grid style | Actions Q Ribbon search | | | n 🐡 About |
| Apply Copy Paste Fill Default Group Coll Paste Cell | The second secon | Used Type Save Defa state | ult Installed equipment help | | |
| Main Edit Advance | ed view Grouping | Companion columns Pag | e view Easy edit page help | | |
| EasyEdit # × Search Q | Profile | DTMF Relay Mode DTMF Payload Number | | | |
| ^ | Profile 2 SIPTrunk | RFC2833 110 | | | |
| ~ | Profile 5 SIPTrunk Profile 5 SIPTrunk | Disable 110 Disable 110 | | | |
| Programming Level 🛛 🖬 | Profile 6 SIPTrunk | Disable 110 | | | |
| Advanced terms ACD Advance Call Distribution The Lines Hotal VolP General Settings Gos Settings Gos Settings Gos Settings Gos Settings Gos Settings SisP Tanks Asignment SisP Tanks Data Setup SisP Tanks Data Setup SisP Tanks Data Setup SisP Tanks Bace Settings SisP Tanks Bace Settings SisP Tanks Bace Settings SisP Tanks CODE: Settings SisP Tanks Reace Settings SisP Tanks Measing Constant SisP Tanks Measing Constant SisP Tanks Measing SisP Tanks Indexning Uncertainty SisP Tanks Indexning Uncertainty SisP Tanks Indexning Uncertainty SisP Tanks Indexning Mode SisP Tanks | | | like | n tech (N) Site: ● | File Ver. SVR100 (52)/EMEA (Chaves Ver. 11 |



9. Set your Incoming Trunks to Tie Line mode in *Advanced Items + Tie Lines + Tie Lines + Tie Line Trunk Port Setting*. When this item is set then incoming calls are referenced against the System Numbering Plan.

| ▋ 🕇 🚔 📑 🖢 🎓 🐻 🖓 🐻 ፣ | | Easy edit | | VIS Teams SV9 | 100 Configuration File | E [SV9100 | CP20 EMEA V10.5] | - PCPro | | | - 🗆 X |
|---|-------------|---|-------------------------|--|---------------------------------|--|------------------|----------|-----------|----------|---------|
| F Home View Reports Filter optio | ns Tools | Grid style 🛛 🗛 | Actions | Q_Ribbon se | arch | | | | | | A 🚸 Abo |
| Apply Copy Paste Fill Cell Group Columbia | mn Filter E | Used: 1 Type: DX Type: 1 Type: DX 001 Type: P 001 Type: HL Cxpand Contract all all | ✓ Used ↓ Type | Q ~ ~ | Save Default Inst state equi | 2 talled pment | Page help | * • | | | |
| Main Edit Advance | d view | Grouping | Companio | n columns | Page view | | Easy edit pa | ge help | | | |
| EasyEdit A × | | | | | | | | | | | |
| Search Q | Irunk | Trunk Name | Mode 1 | Mode 2 | Mode 3 N | lode 4 | Mode 5 | Mode 6 | Mode / | Mode 8 | |
| | 067 | SIP 3 | Normal | Normal | Normal N | lomal | Normal | Normal | Normal | Normal | |
| ~ | 068 | SIP 4 | Normal | Normal | Normal N | lomal | Normal | Normal | Normal | Normal | |
| | 069 | SIP 5 | Normal | Normal | Normal N | lormal | Normal | Normal | Normal | Normal | |
| V | 070 | SIP 6 | Normal | Normal | Normal N | lomal | Normal | Normal | Normal | Normal | |
| | 071 | SIP 7 | Normal | Normal | Normal N | lormal | Normal | Normal | Normal | Normal | |
| | 072 | SIP 8 | Normal | Normal | Normal N | lomal | Normal | Normal | Normal | Normal | |
| Programming Level | 073 | SIP P2 1 | Tie line | Tie line | Tie line T | ìe line | Tie line | Tie line | Tie line | Tie line | |
| | 074 | SIP P2 2 | Tie line | Tie line | Tie line T | ie line | Tie line | Tie line | Tie line | Tie line | |
| | 075 | SIP P2 3 | Tie line | Tie line | Tie line T | ìe line | Tie line | Tie line | Tie line | Tie line | |
| + Operators | 076 | SIP P2 4 | Tie line | Tie line | Tie line T | ie line | Tie line | Tie line | Tie line | Tie line | |
| + Irunks | 077 | SIP P2 5 | Tie line | Tie line | Tie line T | ìe line | Tie line | Tie line | Tie line | Tie line | |
| E HG | 078 | SIP P2 6 | Tie line | Tie line | Tie line T | ie line | Tie line | Tie line | Tie line | Tie line | |
| | 079 | SIP P2 7 | Tie line | Tie line | Tie line T | ie line | Tie line | Tie line | Tie line | Tie line | |
| Elevible Binging by Caller ID | 080 | SIP P2 8 | Tie line | Tie line | Tie line T | ie line | Tie line | Tie line | Tie line | Tie line | |
| Encline Ci I | 001 | Use 001 | Manual | Manual | Name N | | Manual | Nama | Neme | Manual | |
| Auto Attendant | 082 | Line 082 | Normal | Normal | Normal N | lomal | Normal | Normal | Normal | Normal | |
| Queue Messages | 083 | Line 083 | Normal | Normal | Normal N | lormal | Normal | Normal | Normal | Normal | |
| Voicemail | 084 | Line 084 | Normal | Normal | Normal N | lormal | Normal | Normal | Normal | Normal | |
| Night Service | 085 | Line 085 | Normal | Normal | Normal N | lomal | Nomal | Normal | Normal | Normal | |
| + Eco Mode | 086 | Line 086 | Normal | Normal | Normal N | lomal | Normal | Normal | Normal | Normal | |
| ARS Automatic Route Selection | 087 | Line 087 | Normal | Normal | Normal N | lomal | Nomal | Normal | Normal | Normal | |
| LCR LCR | 088 | Line U88 | Normal | Normal | Normal | iomai | Nomai | ivormai | rvormal | Normal | |
| + F-Route | 089 | Line 089 | Normal | Normal | Normal N | lomal | Nomal | Normal | Normal | Normal | |
| Additional Devices | 090 | Line 090 | Normal | Normal | Normal N | iomai | Nomai | Normal | Normal | Normal | |
| Advanced items | 000 | Line U91 | Normal | Normal | Normal N | iormal | ivomal | Normal | Normal | Normal | |
| I Te Lines | 092 | Line 092 | Normal | Nemal | Normal N | lormal | Nomal | Normal | Namal | Normal | |
| Tie lines | 093 | Line U93 | Normal | Normal | Normal N | ormai | ivomai | Normal | Normal | Normal | |
| Tie Line 2 or 4 wire | 095 | Line 094 | Normal | Normal | Nomal N | lomal | Normal | Normal | Normal | Normal | |
| Tie Line Trunk Port Setting | 095 | Line 095 | Nemal | Nomal | Nomal N | loggi al | Nomal | Normal | Nomal | Nomal | |
| Tie Line Basic Setup | 097 | Line 090 | Normal | Normal | Nomal N | lomal | Normal | Normal | Normal | Normal | |
| ···· I Tie Line Timers | 098 | Line 097 | Normal | Nomal | Nomal N | lomal | Normal | Normal | Nomal | Nomal | |
| Tie Line Digit Translation | 099 | Line 099 | Normal | Nomal | Nomal N | lomal | Normal | Normal | Nomal | Normal | |
| Tie Line Trunk to Trunk Routing | 100 | Line 100 | Normal | Normal | Nomal N | lomal | Normal | Normal | Normal | Normal | |
| Tie Line Class of Service | 101 | Line 101 | Normal | Nomal | Nomal N | lomal | Normal | Normal | Nomal | Nomal | |
| L Tie Line Toll Restriction | 102 | Line 102 | Normal | Normal | Nomal N | lomal | Normal | Normal | Normal | Normal | |
| | 103 | Line 102 | Nomal | Nomal | Nomal N | lomal | Normal | Normal | Nomal | Nomal | |
| Expand All Collapse All | 104 | Line 104 | Normal | Nomal | Nomal N | lomal | Normal | Normal | Nomal | Normal | |
| A company of the second | 105 | Line 105 | Manual | Namel | Namel N | la mal | Manual | ALC: A | Manual | ALC: A | |
| Son Early Ford Swittern Lists | 100 | | INCOMPANIES INCOMPANIES | INFORMATION AND AND AND AND AND AND AND AND AND AN | NORDAL IN | E CONTRACTOR OF THE OWNER OWNER OWNER OF THE OWNER | NOTE: | Normal | DOD TO AL | Normal | |

Configure Number Manipulation Rules

For calls from SV9100 to MS Teams

When placing a call to MS Teams it is necessary to use E.164 numbering scheme. The default behaviour of the SV9100 is to send the number as dialled. The easiest place to modify this is in the SBC.

The example below removes the leading 0 digit and replaces it with +44 (replace with local country code), and if 00 is dialled then this is replaced with +.

| | | | | | | | | | | | | | | 4 | |
|--|----------------|----------------------|-------------------|---|--------------------|-------------------------|-------------------------------|------------------------------------|---------------------|---------------------|----------------------|---------------------|---------------|------------|-------|
| UNIVERGE BX9000 IP NETWORK SIGNALING & MEDIA | ADMINISTRATION | | | | | | | | | | | | | parameter, | value |
| General SRD All | | | | | | | | | | | | | | | |
| C TOPOLOGY VIEW | Outbound | Manipulation | s (5) | | | | | | | | | | | | |
| ▲ CORE ENTITIES | _ | | | | | | _ | | | | | | | | |
| SRDs (1) | + New Ed | t Insert 🛧 🖡 | | | re « Paj | ge 1 of 1 =>> | ► Show 10 ¥ | records per page | | | | | | | |
| SIP Interfaces (2) Media Realms (2) | INDEX 🗢 | NAME | ROUTING POLICY | ADDITIONAL MANIPULATION | SOURCE IP GROUP | DESTINATION IP GROUP | SOURCE USERNAME PATTERN | DESTINATION USERNAME PATTERN | MANIPULATED ITEM | REMOVE FROM LEFT | REMOVE FROM RIGHT | LEAVE FROM RIGHT | PREFIX TO ADD | SUFFIX T | O ADD |
| Proxy Sets (3) | 0 | MS Teams E.164 # | Default_SBCRouti | No | Any | MS Teams | 0[1-9] | * | Destination URI | 1 | 0 | 255 | +44 | | |
| IP Groups (5) | 1 | MS Teams E.164 # | Default SBCRouti | No | Any | MS Teams | * | 00 | Destination URI | 2 | 0 | 255 | • | | _ |
| CODERS & PROFILES | 2 | MS Teams > SV91 | Default_SBCRouti | No | MS Teams | SV9100 IP Group | * | +440000000 | Destination URI | 3 | 0 | 255 | 90 | | |
| | 3 | MS Teams > SV91 | Default_SBCRouti | No | SV9100 IP Group | MS Teams | * | * | Destination URI | 3 | 0 | 255 | | | _ |
| ⊿ SBC | 4 | MS Teams > SV91 | Default_SBCRouti | No | MS Teams | SV9100 IP Group | + | * | Source URI | 3 | 0 | 255 | | | _ |
| Routing Policies (1) IP-to-IP Routing (4) | GENER | AL | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | | ACTION | | | | | | | |
| Alternative Reasons Set (0) | Name | | • MS | Teams > SV9100 Ti | e Line TRUNK ACCES | ç | | Manipulate | ditem | Destina | tion URI | | | | 1 I |
| IP Group Set (0) | Addition | al Maninulation | - No | | | | | Remove For | um Left | - Destin | | | | | |
| Manipulation | Call Tria | | No | | | | | Remove Pro | an Der | | | | | | |
| Inbound Manipulations (0) | Call Ing | Rei | Any | | | | | Remove Pro | am kignit | 0 | | | | | |
| Outbound Manipulations (5) | | | | | | | | Leave From | Right | 255 | | | | | |
| SBC General Settings | MATCH | | | | | | | Prefix to Ad | ld | • 90 | | | | | |
| Call Admission Control Profile (0) | Reques | Туре | IIA | | | | | Suffix to Ad | d | | | | | | |
| Malicious Signature (12) | Source | P Group | • MS | Teams | | | View | Privacy Res | triction Mode | Transp | arent | | | | |
| External Media Source (0) | Destina | tion IP Group | • SV9 | 100 IP Group | | | View | | | | | | | | |
| ▶ SIP DEFINITIONS | Source | Jsername Pattern | * | | | | | | | | | | | | |
| MESSAGE MANIPULATION | Source | Host | | | | | | | | | | | | | |
| h MEDIA | Source | fags | | | | | | | | | | | | | |
| 7 million | Destina | tion Username Patter | n • +44 | X000000 | | | | | | | | | | | |
| INTRUSION DETECTION | Destina | tion Host | | | | | | | | | | | | | - 1 |
| | Destina | tion Tags | | | | | | | | | | | | | |
| ▶ SIP RECORDING | Calling | Name Pattern | | | | | | | | | | | | | |
| | Messag | e Condition | | | | | View | | | | | | | | |

| Index | Name | Source IP Group | Dest. IP Group | Dest. Username | Manipulated Item | Remove from | Prefix to Add | Function of this rule? |
|-------|-------------------------|--------------------|-------------------|-------------------|---------------------|----------------|------------------|--|
| | | | | Pattern | | the Left | | |
| 0 | MS Teams E.164 #1 | Any | MS Teams | 0[1-9] | Destination URI | 1 | +44 | This rule will remove one digit from the front of the number when a national number is dialled. |
| 1 | MS Teams E.164 #2 | Any | MS Teams | 00 | Destination URI | 2 | + | This rule removes the international prefix and replaces with + |

For Calls from MS Teams to SV9100

For calls towards the SV9100 we need to also modify the number format. In this case we need to modify both the Source and Destination URI.

Again, this example is based on country code 44 and a station numbering plan of 2XX on the SV9100.

You may need to modify these rules to suit your numbering plan.

| | | | | | | | | | | | Save | Reset | Actions + | 4 Admi |
|---|----------------|----------------------------|-------------------------|----------------------------|--------------------|-------------------------|-------------------------------|------------------------------------|-----------------|---------------------|----------------------|---------------------|---------------|------------------|
| UNIVERGE 8X9000 IP NETWORK SIGNALING & MEDIA | ADMINISTRATION | | | | | | | | | | | | D Entity,) | parameter, value |
| 🔹 💿 SRD 🛛 All 💌 | | | | | | | | | | | | | | |
| C TOPOLOGY VIEW | Outbound | Manipulation | s (5) | | | | | | | | | | | |
| CORE ENTITIES | + New Edit | Insert 🛨 🕸 | . 1 | | te ce Pa | ge 1 of 1 🔛 | E Show 10 ¥ | records per page | | | | | | Q |
| SIP Interfaces (2) Media Realms (2) | INDEX 🗢 | NAME | ROUTING POLICY | ADDITIONAL MANIPULATION | SOURCE IP GROUP | DESTINATION IP GROUP | SOURCE USERNAME PATTERN | DESTINATION USERNAME PATTERN | MANIPULATED | REMOVE FROM LEFT | REMOVE FROM RIGHT | LEAVE FROM RIGHT | PREFIX TO ADD | SUFFIX TO ADD |
| Proxy Sets (3) | 0 | MS Teams E.164 # | Default_SBCRouti | No | Any | MS Teams | 0[1-9] | * | Destination URI | 1 | 0 | 255 | +44 | |
| IP Groups (5) | 1 | MS Teams E.164 # | Default_SBCRouti | No | Any | MS Teams | * | 00 | Destination URI | 2 | 0 | 255 | + | |
| | 2 | MS Teams > SV91 | Default_SBCRouti | No | MS Teams | SV9100 IP Group | × | +4430000000 | Destination URI | 3 | 0 | 255 | 90 | |
| P CODEND & PNOTIEED | 3 | MS Teams > SV91 | Default_SBCRouti | No | SV9100 IP Group | MS Teams | * | * | Destination URI | 3 | 0 | 255 | | |
| ⊿ SBC | 4 | MS Teams > SV91 | Default_SBCRouti | No | MS Teams | SV9100 IP Group | + | * | Source URI | 3 | 0 | 255 | | |
| Routing Routing Policies (1) IP-to-IP Routing (4) | GENERA | L | | , | | | | ACTION | | | | | | - |
| Alternative Reasons Set (0) | Name | | MS | Teams > SV9100 Ti | e Line TRUNK ACCES | s | | Manipulate | d item | Destina | ation URI | | | |
| IP Group Set (0) | Addition | al Manipulation | No | | | | | Remove Fro | om Left | • 3 | | | | |
| Manipulation | Call Trig | ter | Any | | | | | Remove Fro | om Right | 0 | | | | |
| Inbound Manipulations (0) | | | | | | | | Leave From | Right | 255 | | | | |
| Outbound Manipulations (5) | | | | | | | | Prefix to Ad | d | • 90 | | | | |
| SBC General Settings | MATCH | | | | | | | Suffix to Ad | d | | | | | |
| Maliciour Cimature (12) | Request | Туре | All | | | | | Drivery Dee | e Mada | τ | | | | |
| External Media Source (0) | Source II | Group | MS | Teams | | | View | rindey heat | | Thursp | on en e | | | |
| | Destinat | on IP Group | SVS | 100 IP Group | | | View | | | | | | | |
| SIP DEFINITIONS | Source U | sername Pattern | * | | | | | | | | | | | |
| MESSAGE MANIPULATION | Source H | lost | * | | | | | | | | | | | |
| ▶ MEDIA | Destinat | ags ion Username Patter | m • +44 | 20000000 | | | | | | | | | | |
| | Destinat | on Host | * | | | | | | | | | | | |
| | Destinat | on Tags | | | | | | | | | | | | |
| ▶ SIP RECORDING | Calling N | ame Pattern | * | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

| Index | Name | Source | Dest. IP | Source | Dest. | Manipulated | Remove | Prefix | Function of this |
|-------|---|-------------|----------|----------|------------|--------------------|----------|--------|--|
| | | IP | Group | Username | Username | Item | from | to | rule? |
| | | Group | | Pattern | Pattern | | the Left | Add | |
| 2 | MS Teams > SV9100 Tie Line TRUNK ACCESS | MS Teams | SV9100 | * | +44XXXXXXX | Destination URI | 3 | 90 | *Optional* This rule is used when PSTN breakout through the SV9100 is required. It will add the trunk access code 9 and also normalise the PSTN dialled number.** |
| 3 | MS Teams > SV9100 Tie Line DEST | MS Teams | SV9100 | * | +442XX | Destination URI | 3 | | This rule will remove the +44 in front of the dialled PBX number |
| 4 | MS Teams > SV9100 Tie Line SOURCE | MS Teams | SV9100 | + | * | Source URI | 3 | 0 | This rule normalises the received number from E.164 to national format |

** Additional settings are required for PSTN breakout. See section later in this document.



Test the SIP trunk between MS Teams and SV9100 Dialling from the SV9100 to MS Teams

To test the SIP trunk connection between MS Teams and SV9100 select the IP trunk. You can use the default service code 805 (check codes for your region) followed by the trunk number.

For example, 805 073 will select IP Trunk #73. Dial the PSTN number of the MS Teams user.

Here we can see a request from the SV9100 @ 192.168.88.160 towards the SBC;



Outbound Number Manipulation is then carried out on the outbound leg towards MS Cloud PBX.





Dialling from MS Teams to SV9100

Use the MS Teams client to make a call to one of your SV9100 PBX Extensions.



Here we can see the inbound request from MS Teams Cloud PBX;



And the number is normalised by the Outbound Number Manipulation Rules towards the SV9100



Configure F-Route

F-Route allows quick dialling of MS Teams users from the SV9100 system. In this example the numbers below are used;

MS Teams User PSTN Number **+44 115 9695700** Number required to dial from SV9100 **01159695700** on SIP Trunks Profile 2 F-Route number **5700**

So this means that we can implement a rule in the SV9100 to modify dialled number 57xx into 011596957xx and dial on SIP trunks towards the MS Teams Direct Routing connection.

1. Group the SIP Tie Line Trunks in *Trunks + Trunk Group Routing + Trunk Group*. Add the created trunks into an unused trunk group (3 is used here).

| 1 🗟 🏝 🕨 🗍 🛉 👳 🤞 | 9 🥅 ¥ | | | | Easy eo | iit M | 1S Teams SV91 | 00 Configuration File [SV91 | 0 CP20 EMEA V10.5] - PCPr | 0 | - 🗆 X |
|-------------------------------|---------------------------|------------|-----------|---------------|--|-------------|---------------|-----------------------------|---------------------------|----------------|--|
| File Home View | Reports | Filter | options | Tools | Grid style | Actions | Ribbon sea | rch | | | r 🚸 About |
| Apply Copy Paste Fill | 0 0 Default cell | Group | Column | Filter bar | Used: 1 Type: 001 Type: Type: 01 011 Type: HL1 Expand Contract all all | ✓ Used | * | Save Default Installed | Page help | * | |
| Main Edit | | Adv | vanced vi | ew | Grouping | Companion | columns | Page view | Easy edit page help | | |
| EasyEdit | | Д | × | | | | | | | | ^ |
| Search | | | 0 | Trunk | Trunk Name | Trunk Group | Priority | | | | |
| | | | · - | 067 | SIP 3 | 2 | 67 | | | | |
| | | | | 068 | SIP 4 | 2 | 68 | | | | |
| | | | | 069 | SIP 5 | 2 | 69 | | | | |
| | | | | 070 | SIP 6 | 2 | 70 | | | | |
| | | | × I | 071 | SIP 7 | 2 | 71 | | | | |
| | | | - I | 072 | SIP 8 | 2 | 72 | | | | |
| Programming Level | | - F | | 073 | SIP P2 1 | 3 | 73 | | | | |
| riggianning coron | ſ | | | 074 | SIP P2 2 | 3 | 74 | | | | |
| | | | _ 11 | 075 | SIP P2 3 | 3 | 75 | | | | |
| System Numbering Plan | | | ^ | 076 | SIP P2 4 | 3 | 76 | | | | |
| Speed Dial | | | | 077 | SIP P2 5 | 3 | 77 | | | | |
| Extensions | | | | 078 | SIP P2 6 | 3 | 78 | | | | |
| Department Groups | | | - 11 | 079 | SIP P2 7 | 3 | 79 | | | | |
| + cos | | | | 080 | SIP P2 8 | 3 | 80 | | | | |
| Toll Restriction | | | | 081 | Line UST | 1 | 81 | | | | |
| Imers Imers Imers | | | | 082 | Line 082 | 1 | 82 | | | | |
| + Operators | | | | 083 | Line 083 | 1 | 83 | | | | |
| E Tranke | | | | 084 | Line 084 | 1 | 84 | | | | |
| - F General | | | | 085 | Line 085 | 1 | 85 | | | | |
| Trunk Group Routing | | | | 086 | Line 086 | 1 | 86 | | | | |
| Trunk Group | | | | 087 | Line 087 | 1 | 87 | | | | |
| - Trunk Group Route | | | | 088 | Line 088 | 1 | 88 | | | | |
| - Route per Extension | | | | 089 | Line 089 | 1 | 89 | | | | |
| 🖸 Alternate Route per E | xtension | | | 090 | Line 090 | 1 | 90 | | | | |
| ···· 🛨 Virtual Trunk Group F | louting | | | 091 | Line 091 | 1 | 91 | | | | |
| Trunk to Trunk Routing | | | | 092 | Line 092 | 1 | 92 | | | | |
| - + Analogue Trunks | | | | 093 | Line 093 | 1 | 93 | | | | |
| Tarah Assas Mars | | | - 1. | 094 | Line 094 | 1 | 94 | | | | |
| Trunk Access Maps | | | | 095 | Line 095 | 1 | 95 | | | | |
| | | | | 096 | Line 096 | 1 | 96 | | | | |
| F DI | | | | 097 | Line 097 | 1 | 97 | | | | |
| 1 DDI | | | | 098 | Line 098 | 1 | 98 | | | | |
| Flexible Ringing by Caller ID | | | | 099 | Line 099 | 1 | 99 | | | | |
| Flexible CLI | | | | 100 | Line 100 | 1 | 100 | | | | |
| Auto Attendant | | | ~ | 101 | Line 101 | 1 | 101 | | | | |
| | | | =1 | 102 | Line 102 | 1 | 102 | | | | |
| Ex | pand Al | Collapse / | 41 | 103 | Line 103 | 1 | 103 | | | | |
| | | | | 104 | Line 104 | 1 | 104 | | | | |
| System Data | | | | 105 | une 105 | 1 | 100 | | | | * |
| Done | | | | | | | | | | ser: tech (IN) | File Ver: SV9100 CP20 EMEA Chassis Ver: 11 🗾 |



2. Modify your system numbering plan in *System Numbering Plan + System Numbering*. In my example 57 and 58 are four digit F-Route numbers.

| ┓╻╋╘┇╋╺╔╻ | | | | Easy ec | it M | 1S Teams SV9 | 100 Confi | guration File [SV9 | 100 CP20 E | MEA V10.5] - P | CPro | | | – 🗆 × |
|---|--------------------------------|--------------------|---|---|--|--|-----------|--|----------------|----------------|-----------------|-------|--------------------------|---------------------|
| F Home View | Reports | Filter opt | ions Tools | Grid style | Actions | Ribbon se | earch | | | | | | | 🔺 🔅 About |
| Apply Copy Paste F | 0 0 fill Default cell | Group Co by che | Filter boser bar | Uted: 1 See DX Type: See D2 DC See D DC See D See D See D2 See D2 | Used Type | columns | Save f | Default Installed equipmer | t Page help | 🗊 11-01 | nelp | | | |
| FasyEdit | | Д× | | | | | | | | | | | | |
| Search | | 9 | 1st Dial D | Viait 1st and 2nd Vial Digits | Dial Digit Length | Туре | | Networkin | ID | | | | | |
| Programming Level Programming Level Initial setup vizzard Chassis view Blades Chassis view Blades Couck Intal Blade Configuration System Numbering Additional Dial Table Service Codes Coos Plant Operation Deartment Groups Coos Dial Restriction Timer Class of Service Department Groups Coos Timer Class of Service Department Groups Coos Timer Class of Service Dial Restriction Timer Class of Service Dial Classion Dial Dial Dial Dial Dial Dial Dial Dial |) Expand All | | 555555555555555555555555555555555555555 | x ab x | 2 calb 2 calb 2 calb 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | alb Not used Extension Extension Extension Extension Extension Extension Extension Extension Extension Extension Extension | | cals cals | ρ | | | | | |
| A FacyEdit System Data | | | | | | | | | | | | | | |
| Done | | | | | | | | | | | User: tech (IN) | Site: | File Ver: SV9100 CP20 El | MEA Chassis Ver: 11 |

3. Configure the F-Route dialled lead digits in *F-Route + Dial Analysis Table lead digits*. In this example any digits dialled in the range 5700-5799 and 5800-5899 will go to F-Route Table number 1.

| 🎫 🖬 🏝 📭 🔶 🕇 💷 🖉 🧊 ፣ | Easy edit | MS Teams SV9100 Configuration | n File [SV9100 CP20 El | MEA V10.5] - PCPro | – 🗆 × |
|---|------------------------|-------------------------------|-------------------------------------|-----------------------|---|
| File Home View Reports Filter options | Tools Grid style Actio | ns 🛛 🖓 Ribbon search | | | r 🚸 About |
| Apply Copy Paste Fill Default cell | Filter bar all all | Jsed ype | Installed equipment Page help | 9 44-02 • | |
| Main Edit Advanced vi | ew Grouping Co | mpanion columns Page v | ew l | Easy edit page help | |
| EasyEdit 4 × | Table Dial Ser | vice Additional | Dial Tone | | ^ |
| Search Q | Digita Typ | c Data | Simulation | | |
| | 001 57@@ F-F | oute Table 1 | | | |
| <u>^</u> | 002 58@@ F-F | oute Table 1 | | | |
| | 000 110 | Joi 0 | | | |
| | 004 Not | set 0 | | | |
| | 005 Not | set 0 | | | |
| | 006 Not | set 0 | | | |
| Programming Level | 007 Not | set 0 | | | |
| | 008 Not | set 0 | | | |
| | 009 Not | set 0 | | | |
| Operators | 010 Not | set 0 | | | |
| Trunks | 011 Not | set 0 | | | |
| + IHG | 012 Not | set 0 | | | |
| | 013 Not | set 0 | | | |
| DDI DDI DDI DDI | 014 Not | set 0 | | | |
| Fiexible Flinging by Caller ID El Pavible CLI | 015 Not | set 0 | | | |
| Auto Attendant | 016 Not | set 0 | | | |
| + Queue Messages | 017 Not | set 0 | | | |
| Voicemail | 018 Not | set 0 | | | |
| Night Service | 019 Not | set 0 | | | |
| + Eco Mode | 020 Not | set 0 | | | |
| ARS Automatic Route Selection | 021 Not | set 0 | | | |
| 1 LCR | 022 Not | set 0 | | | |
| E F-Route | 023 Not | set 0 | | | |
| Time Schedule | 024 Not | set 0 | | | |
| F-Route Dial Tone Simulation | 025 Not | set 0 | | | |
| Dial Analysis Table lead digits | 026 Not | set 0 | | | |
| Additional Analyse Tables | 027 Not | set 0 | | | |
| Cascade Additional Tables | 028 Not | set 0 | | | |
| E Pauto Selection for Time schedule | 029 Not | set 0 | | | |
| - FRoute Table | 030 Not | set 0 | | | |
| - F-Boute Gain Table | 031 Not | set 0 | | | |
| Add Digit Table | U32 Not | set 0 | | | |
| Time schedule for F-Route service | V33 Not | set 0 | | | |
| Weekly schedule for F-Route service | V34 Not | set 0 | | | |
| Holiday schedule for F-Route service | Not Not | set U | | | |
| | U36 Not | set 0 | | | |
| Expand All Collapse All | 03/ Not | set U | | | |
| | Not Not | set U | | | |
| System Data | Not Not | set U | | | ¥ |
| Done | | | | User: tech (IN) Site: | File Ver: SV9100 CP20 EMEA Chassis Ver: 1 |

4. Configure F-Route Table number 1 to route the dialled number to Trunk Group 3 for the SIP tie-lines and include an Additional Dial Table to complete the full PSTN number. This is programmed in *F-Route + F-Route Table*. Also set the maximum number of Dialling Digits to the same as the PSTN number (11) to eliminate dialling delay.

| 🗒 🛃 🏝 🕶 🦊 🛧 🕸 🖉 🥅 ? | | Easy edi | it MS Tea | ams SV9100 Co | nfiguration File | [SV9100 CP20 | EMEA V10.5] - PCPr | 0 | | | | - | □ × |
|---------------------------------------|-------------------------|--|---------------------------------|-----------------------|------------------|---------------------|---------------------|-------------------|---------|----------------|---------------|------------------------------------|-----------------|
| File Home View Reports Filter opti | ions Tools | Grid style | Actions Q R | bbon search | | | | | | | | | 🔺 💔 About |
| Apply Copy Paste Fill Default | Iumn Filter Exposer bar | Dect 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Used Type | Save state | Default Insta | alled Pagenent help | Face edit page bein | 4 | | | | | |
| Franklik II V | | crouping 1 | companion cora | | - age new | | cary care page neip | | | | | | |
| EasyEdit 4 × | F-Route Table | | | | | | | | | | | | ^ |
| Search | | | | | | | | | 100.01 | | | | |
| | Table | Number | Trunk Group | Delete Dial Digits | Digits Table | Beep Tone | Internal Call | Tandem Connection | Service | Dial Treatment | Dialing Digit | Point Code | Parameter Ta |
| ^ | E-BouteTa | ble: 001 | | - | - | | | | | | | | |
| | | | 3 | 0 | 1 | | 0 | 0 | 0 | 0 | 11 | | 0 |
| ~ | 001 | 2 | | 0 | 0 | i i | 0 | 0 | 0 | 0 | | - | 0 |
| | 001 | 3 | 0 | 0 | 0 | Ē | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Promotion I and | 001 | 4 | 0 | 0 | 0 | Ē | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | F-Route Ta | ble: 002 | | | | | | | | | | | |
| | 002 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| + Operators | 002 | 2 | 0 | 0 | 0 | Ē | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trunks | 002 | 3 | 0 | 0 | 0 | Ē | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| IT IRG | 002 | 4 | 0 | 0 | 0 | Ē | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I DIL | E-BouteTa | ble: 003 | | | • | | | • | | • | | | |
| ± DDI | 003 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flexible Ringing by Caller ID | 003 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flexible CLI | 003 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Auto Attendant | 003 | 3 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Queue Messages | C E Peude Te | 4 hlai 004 | U | 0 | 0 | I | 0 | U | U | 0 | 0 | v | 0 |
| Voicemail | -Houle Ta | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Night Service | 004 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eco Mode | 004 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ARS Automatic Route Selection | 004 | 3 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 LCR | 004 | 4 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-Route | E F-Route la | ble: 005 | | | | _ | | | | | | | |
| 🖸 Time Schedule | 005 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-Route Dial Tone Simulation | 005 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dial Analysis Table lead digits | 005 | 3 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| L Additional Analyse Tables | 005 | 4 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cascade Additional Tables | F-RouteTa | ble: 006 | | | | _ | | | | | | | |
| Fallback F-Houte | 006 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| - F-Route Selection for Time schedule | 006 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| F-Houte Table | 006 | 3 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Add Due Table | 006 | 4 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| I Time schedule for E-Poute service | 🖃 F-Route Ta | ble: 007 | | | | | | | | | | | |
| Weakly schedule for E-Route service | 007 | 1 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Holiday schedule for F-Boute service | 007 | 2 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 007 | 3 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Expand All Collapse All | 007 | 4 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 🔄 F-Route Ta | ble: 008 | | | | | | | | | | | ~ |
| 🐟 EasyEdit 📢 System Data | < | | | | | | | | | | | | > |
| Dent | | | | | | | lu. | ann Annh (IND) | | | It. I Sile Me | - 51/0100 CD20 EMEA Char | nin Man del 🗖 🗌 |
| D'Ulle | | | | | | | | Sen teen nivi | 10.5 | | rile ve | IN A VELICIAL STREET CIVICAL STICL | |

5. Use the Additional Digit Tables to complete the PSTN number which should be dialled. Example - If the user dials 5701 then this will send 01159695701 towards the SIP tie-line. This is programmed in *F-Route + Add Digit Table*.



Configure ARS to remove dial delays – Optional

If you are using the SV9100 as a transit system, so calls are made from MS Teams > Direct Routing > SV9100 > PSTN and the PSTN trunks connected to the SV9100 are also SIP, then you will have a delay on the outgoing call leg. You can use ARS to analyse the digits dialled and eliminate the call delay.

1. Enable the ARS service in ARS Automatic Route Selection + ARS Enable.



2. Configure a dial string analysis table in *ARS Automatic Route Selection + ARS Dial string*. This table must be modified to suit your local region. For example UK national numbers start with 0 and are 11 digits in length. The trunk group is the PSTN trunk group connected to the SV9100.





3. Configure the Dial Treatment in *ARS Automatic Route Selection + ARS Dial Treatment*. This treatment will **R**edial **D**ial **01** additional digits, which is **#** and then **E**nd the dial treatment. This means that SIP calls are suffixed with a **#**.

| 🗒 🛃 🏝 📭 🦆 🛉 💷 🖉 🥅 ፣ | Easy edit | MS Teams SV9100 Configuration File [SV9100 CP20 EMEA V10.5] - PCPro | - 🗆 × |
|---|---------------------------------|---|---|
| File Home View Reports Filter opt | otions Tools Grid style Actions | Ribbon search | About 🔷 |
| Apply Copy Paste Fill Default Group Cell | lolumn Filter hooser bar | Swe Default Installed state equipment help | |
| Main Edit Advan | nced view Grouping Compa | nion columns Page view Easy edit page help | |
| EasyEdit # × Search Q | Dial Treatment | | |
| <u>`</u> | 02 03 04 05 06 | | |
| Programming Level 🚥 🖬 | | | |
| System Nanbering Plan See Observed See Obser | | | |
| Done | | User: tech (IN) Sit | e: File Ver: SV9100 CP20 EMEA Chassis Ver: 11 📲 |

Configure Coder Transcoding (Optional)

The SV9100 does not support SILK NB or SILK WB codecs. These codecs provide good properties for high latency connections, providing resiliency for lost or delayed RTP packets. The SBC is capable of transcoding calls. This is feature requires hardware DSPs for the BX800 device, or virtual DSPs which are a licensed feature of the BX9000.

This example is based on the BX9000. Transcoding on the BX9000 also requires additional vCPU resources. Please see Release Notes for more information.

1. Ensure that you have a license key for Transcoding and the codecs are supported in SETUP > ADMINISTRATION > LICENSE > License Key.

| | | | | | | | O Foria | narameter u | 2440 |
|---------------------------------|---------------------------------------|------|------------------------|-----------------|--------------|----------------|------------|-----------------|------|
| VERGE BAGOOV IP NETWORK SIGNALI | NG & MEDIA ADMINISTRATION | | | | | | D Entity | , parameter, va | nue |
| SRD All | | | | | | | | | |
| TIME & DATE | License Key | | | | | | | | |
| WEB & CLI | | | Local License Key | | | | 79 | | |
| SNMP | Product Key | | Mode | Serial Number | | | Device Typ | 8 | |
| LICENSE | GENERAL | | VOIP SIGNALING PROTOCO | ILS | SBC CAPA | CITY | | | |
| License Key | High Availability (HA) | 0 | SIP | 0 | SRC Service | ns | | Local Actual | |
| Floating License | DSP Channels | 252 | | | Far End Lise | ers (EELI) | | 100 100 | - |
| MAINTENANCE | Maximum Supported Software Version | 9.99 | | | Transcodin | g Sessions | | 125 125 | 1 |
| | SKYPE FOR BUSINESS | | CODERS | | SECURITY | FEATURES | | | |
| | MSET | 0 | 6 723 6 729 6 727 6 72 | SILK-NR SILK-WR | IDSec | | | 0 | |
| | TEAMS | õ | Opus-NB Opus-WB | | Media Encr | yption | | ŏ | |
| | | | | | Encrypt Cor | ntrol Protocol | | õ | |
| | IP MEDIA FEATURES | | MANAGEMENT FEATURES | | HTTP PRO | XY | | | |
| | VXML | 0 | CLI | 0 | HTTP Proxy | (| | 0 | |
| | | | EMS | 0 | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | Planting Linear | | - | | | | |

2. Enable the number of Media Channels in *SETUP > SIGNALING & MEDIA > MEDIA > Media Settings*. Also check that the SDP Session Owner does not contain any illegal characters (space).

| NEC BX9000 | | | | | - 🗆 × |
|--|--------------------------|----------------------------|-----------------------------------|----------------------------|----------------------|
| | JBLESHOOT | | Save | Reset Actions - | , Admin → |
| UNIVERGE BX9000 IP NETWORK SIGNALING 8 | MEDIA ADMINISTRATION | | | ⊖ Entity | , parameter, value |
| € (→ SRD All ▼ | | | | | |
| C TOPOLOGY VIEW | Media Settings | | | | |
| CORE ENTITIES | GENERAL | | ROBUSTNESS | | |
| CODERS & PROFILES | NAT Traversal | Disable NAT 🔻 | Inbound Media Latch Mode | Dynamic | T |
| ▶ SBC | Enable Continuity Tones | Disable 🔻 🗲 | New RTP Stream Packets | 3 | |
| SIP DEFINITIONS | Number of Media Channels | • 120 | New RTCP Stream Packets | 3 | |
| MESSAGE MANIPULATION | Enforce Media Order | Disable v | New SRTP Stream Packets | 3 | |
| ▲ MEDIA | SDP Session Owner | UNIVERGEBX9000 | New SRTCP Stream Packets | 3 | |
| Media Security | | | Timeout To Relatch RTP (msec) | 200 | |
| RTP/RTCP Settings | SBC SETTINGS | | Timeout To Relatch SRTP (msec) | 200 | |
| Fax/Modem/CID Settings | Preferences Mode | Doesn't Include Extensions | Timeout To Relatch Silence (msec) | 10000 | |
| Media Settings | Enforce Media Order | Disable • | Timeout To Relatch RTCP (msec) | 10000 | |
| Quality of Experience | | | | | |
| INTRUSION DETECTION | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | Cancel | APPLY | | |



3. Enable Transcoding support in SETUP > SIGNALING & MEDIA > SBC > SBC General Settings.

| NEC BX9000 | | | | | | | - | n × |
|--|--|--|-------|------|-------|-----------|--------------|--------------------|
| | LESHOOT | | | Save | Reset | Actions 🗸 | 4ª | Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING & M | IEDIA ADMINISTRATION | | | | | ⊖ Entit | y, parameter | , value |
| SRD All TOPOLOGY VIEW CORE ENTITIES CODERS & PROFILES SBC Classification (1) Routing Policies (1) If-co-IP Routing (5) Alternative Reasons Set (0) IP Group Set (0) Poroup Set (0) Side Centered Settings Call Admission Control Profile (0) Malicious Signature (12) External Media Source (0) SID DEFINITIONS | SBC General Settings GENERAL Direct Media Unclassified Calls Forking Handling Mode No Answer Timeout [sec] Broad/Works Survivability Feature Max Forwards Limit Max Call Duration [min] No RTP Timeout After Connect [ms] Keep original user in Register SBC Performance Profile Routing Timeout [sec] | Disable T Reject T Latch On First T 600 Disable T 70 0 0 Do not keep user; Override wit T Optimized for transcoding T 10 | 5 | | | | | |
| MESSAGE MANIPULATION | Call duration that counts as a short call | 2 | | | | | | |
| ▶ MEDIA | | | | | | | | - 11 |
| ▶ INTRUSION DETECTION | FORWARD & TRANSFER | | | | | | | |
| | SBC REFER Behavior | Regular 🔻 | | | | | | |
| | | Can | APPLY | | | | | |

4. Create an 'Allowed' coder group for MS Teams in *SETUP > SIGNALING & MEDIA > CODERS & PROFILES > Allowed Audio Coders Groups.* Open the child table.

| NEC BX9000 | | | | | | - | \Box × |
|--|---------------------------------|--|------|-------|-----------|------------------|--------------------|
| | IBLESHOOT | | Save | Reset | Actions 🗸 | <mark>ل</mark> ې | Admin - |
| UNIVERGE BX9000 IP NETWORK SIGNALING 8 | MEDIA ADMINISTRATION | | | | ,⊖ Enti | y, paramete | r, value |
| SRD All | | | | | | | |
| C TOPOLOGY VIEW | Allowed Audio Coders Groups (2) | | | | | | |
| ► CORE ENTITIES | + New Edit 🔟 | records per page 1 of 1 → → Show 10 ▼ records per page | | | | | Ω |
| CODERS & PROFILES | | NAME | | | | | |
| IP Profiles (2) | 0 | MS Teams | | | | | |
| Coder Settings | 1 | SV9100 | | | | | |
| Coder Groups | | | | | | | |
| Allowed Audio Coders Groups (2) Allowed Video Coders Groups (0) | | | | | | | |
| | | | | | | | |
| ▶ SBC | | | | | | _ | ~ |
| SIP DEFINITIONS | #1[SV9100] | | | | | Edi | it |
| MESSAGE MANIPULATION | | | | | | | |
| MEDIA | GENERAL | | | | | | |
| | Name | | | | | | |
| PINTROSION DETECTION | Allowed Audio Coders 3 items >> | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



5. In the child table add the restricted codecs.

6. Associate the restricted codecs list with the MS Teams IP Profile in SETUP > SIGNALING & MEDIA . CODERS & PROFILES > IP Profiles.

| NEC NEC BX9000 | | | | | | | - 🗆 X |
|-----------------|-------------------------------|--------------------------|------------------|---------------------------|-------------------------------------|----------------------------|--------------------|
| NEC | SETUP MONITOR TROUB | LESHOOT | | | Save | Reset Actions - | Admin - |
| UNIVERGE BX9000 | IP NETWORK SIGNALING & M | AEDIA ADMINISTRATION | | | | ⊖ Entity, | parameter, value |
| 🗢 🔿 SRD All | v | | | | | | |
| | rofiles [MS Teams IP Profile] | ue • by media | | | | - | × |
| CORE ENTI | Remote RFC 3960 Support | Not Supported | ٣ | NAT UDP Registration Time | 4 | | |
| CODERS & | Remote Can Play Ringback | Yes | Ŧ | NAT TCP Registration Time | -1 | | |
| IP Profiles (| Generate RTP | None | Ŧ | | | | |
| Coder Setti | | | | SBC FORWARD AND TRANSFE | ER | | |
| Allowed Au | SBC MEDIA | | | Remote REFER Mode | Handle Locally | Ŧ | 1.1 |
| Allowed Vic | Mediation Mode | RTP Mediation | Ŧ | Remote Replaces Mode | Standard | • | |
| ▶ SBC | Extension Coders Group | #1 [AudioCodersGroups_1] | • | Play RBT To Transferee | No | • | |
| > SIP DEFINI | Allowed Audio Coders | #0 [MS Teams] | ✓ View | Remote 3xx Mode | Handle Locally | • | Edit |
| MESSAGE I | Allowed Coders Mode | Restriction | | | | | |
| ▶ MEDIA | Allowed Video Coders | | ✓ View | SBC HOLD | | | |
| h INTRUCION | Allowed Media Types | | | Remote Hold Format | • Inactive | Ψ | |
| INTROSION | Direct Media Tag | | | Reliable Held Tone Source | Yes | Ŧ | |
| | RFC 2833 Mode | As Is | • | Play Held Tone | No | T | |
| | · · · | | | | | | |
| | | | Cancel | APPLY | | | |
| | | SBC Enforce MKI Size | Don't enforce | | Remote Delayed Offer S • Not Suppor | ted | |
| | | SBC Media Security Meth | SDES | | MSRP re-INVITE/UPDATE Supported | | |
| | | Reset SRTP Upon Re-key | Disable | | MSRP Offer Setup Role ActPass | | |
| | | Generate SRTP Keys Mode | Only If Required | | MSKP Empty Message F Default | | |

\Orchestrating a brighter world



7. Verify the transcoding function is functioning. You can check this in the syslog debug of the BX SBC.

| 152.100.00.0 | LUCALU. HULLUE | 10-1000241 | 1010-210101.114.00011 | 1.19 | 1420021 3 | SOCIDE SECULEVIES CULEUREN - 1, CYDE - MODIO, CAU - 1007 - HEW SCACE, WAIT FOI ENCEND [1 | INC. 10-02(020.00.20.110) |
|--------------|----------------|------------|-----------------------|------|-----------|---|---|
| 192.168.88.5 | local0.notice | [S=155625] | [SID=21916f:114:5051] | (N | 142863) M | MRC::AllocateMediaResources [Time:15-02@23:06:26.118] | |
| 192.168.88.5 | local0.notice | [S=155626] | [SID=21916f:114:5051] | (N | 142864) C | ConnectionData::CalculateResourcesForExtTranscoding Leading:DSP Opposite:CODERTRANSCODING N | ediationLevel:RTP [Time:15-02@23:06:26.119] |
| 192.168.88.5 | local0.notice | [S=155627] | [SID=21916f:114:5051] | (N | 142865) R | ResourceCounter: Coder Transcoding session +1 [1/125] [Time:15-02@23:06:26.119] | |
| 192.168.88.5 | local0.notice | [S=155628] | [SID=21916f:114:5051] | (N | 142866) R | ResourceCounter: Media channel +1 [1/120] [Time:15-02@23:06:26.119] | |
| 192.168.88.5 | local0.notice | [S=155629] | [SID=21916f:114:5051] | (N | 142807) < | #253/ CID=-100 ChannetResource::AttocateResource DSP Attocated. Avaitable count 1021 [110 | e:15-02@23:06:26.119] |
| 192.168.88.5 | local0.notice | [S=155630] | [SID=21916f:114:5051] | (N | 142868) R | ResourceCounter: Media channel +1 [2/120] [Time:15-02@23:06:26.119] | |
| 192.168.88.5 | local0.notice | [S=155631] | [SID=21916f:114:5051] | (N | 142869) < | <(#254)>CID=-100 ChannelResource::AllocateResource DSP Allocated. Available count 1020 [Tim | e:15-02@23:06:26.119] |
| 192.168.88.5 | local0.notice | [S=155632] | [SID=21916f:114:5051] | (N | 142870) (| (#279)RTS::AllocateResource CODERTRANSCODING already Allocated. [Time:15-02@23:06:26.119] | |
| 192.168.88.5 | local0.notice | [S=155633] | [SID=21916f:114:5051] | (N | 142871) (| (#278)RTS::AllocateResource DSP already Allocated. [Time:15-02@23:06:26.119] | |
| | | | | | | | |



Tested Call Scenarios

Below is a list of tested call scenarios with SV9100 and MS Teams tie-line using Direct Routing.

After each test the trunk resources should be released.

| Index | Category | Description | Pass / Fail | Remarks |
|-------|--------------------------|--|----------------|--|
| 0 | Basic Call Function | Make a call from SV9100 PBX User to MS Teams User | Pass | Incoming call may be displayed in MS Teams client as +442XX. It is possible to call back because SBC manipulates dialled number. |
| 1 | Basic Call Function | Make a call from MS Teams client to SV9100 PBX User | Pass | |
| 2 | Basic Call Function | Hold call from SV9100 > MS Teams using Teams Client. Recover caller. | Pass | |
| 3 | Basic Call Function | Hold call from SV9100 > MS Teams using SV9100 MLT. Recover caller. | Pass | |
| 4 | Outgoing Calls – PSTN | Outgoing call from MS Teams Client to SV9100 Trunk via tie-line | Pass | |
| 5 | Incoming Calls | DDI Routed from SV9100 Trunk to MS Teams User (22- 11) | Pass | Routing of DDI's to F-Route numbers assigned to MS Teams users in target 1 of the DDI translation table is the only supported method of routing DDI's to MS Teams users. MS Teams users cannot be members of other SV9100 routing methods such as incoming ring groups, department groups, etc. |
| 6 | Incoming Calls | DDI Routed from SV9100 Trunk to MS Teams Auto Attendant | Pass | Call is answered and DTMF dial options OK, plus also speech analysis. |
| 7 | Incoming Calls | DDI Routed from SV9100 Trunk to MS Teams Call Queue | Pass | Call is routed to queue group, receives queue hold music and deliver to agent OK. |
| 8 | Call Transfer - PSTN | DDI call to SV9100 MLT > Blind Transfer to MS Teams | Pass | CLIP depends on values set in Flexible CLI + CLI Pass through. Either SV9100 MLT or incoming call CLI. |
| 9 | Call Transfer - PSTN | DDI call to SV9100 MLT > Consult Transfer to MS Teams User | Pass | CLIP depends on values set in Flexible CLI + CLI Pass through. Either SV9100 MLT or incoming call CLI. |
| 10 | Call Transfer - PSTN | DDI call to SV9100 MLT > Blind Transfer to MS Teams User – No answer from MS Teams | Pass | Transfer recall to SV9100 station. Missed call notification on MS Teams. CLIP depends on values set in <i>Flexible CLI + CLI Pass through</i> . Either SV9100 MLT or incoming call CLI. |
| 11 | Call Transfer – PSTN | DDI call from SV9100 Trunk – DDI to MS Teams user, Blind transfer back to SV9100 MLT. | Pass | During the transfer 2 trunks are occupied. CLIP passed by MS Teams is the original incoming caller CLI. |
| 12 | Call Transfer – PSTN | DDI call from SV9100 Trunk – DDI to MS Teams user, Consult transfer back to SV9100 MLT. | Pass | During the transfer 2 trunks are occupied. CLIP passed by MS Teams is the MS Teams User PSTN Number. |
| 13 | Call Transfer | Call from SV9100 MLT > Teams User. Blind transfer back to SV9100 (different) user. | Pass | During the transfer 2 trunks are occupied. |

\Orchestrating a brighter world NEC



| 14 | Call Transfer | Call from SV9100 MLT > Teams User. Consult transfer back to SV9100 (different) user. | Pass | During the transfer 2 trunks are occupied. |
|----|------------------|--|------|---|
| 15 | Call Transfer | Call from SV9100 MLT > Teams User. Consult transfer back to SV9100 but cancel call during transfer. | Pass | During the consult 2 trunks are occupied. |
| 16 | Call Forward | Immediate Call forward SV9100 MLT to MS Teams User | FAIL | Under investigation |
| 17 | Call Forward | Call forward from MS Teams User on Immediate to SV9100 MLT | Pass | |
| 18 | Call Forward | Call forward from MS Teams User on No Answer to SV9100 MLT | Pass | |
| 19 | Voicemail - PSTN | DDI call to MS Teams user with B/NA to voicemail set | Pass | Call is redirected and CLI passed to VM |
| 20 | Voicemail | Call from SV9100 MLT to Teams User with B/NA to voicemail set | Pass | Call is redirected to VM. |
| 21 | Conference | SV9100 MLT setup conference by adding MS Teams user | Pass | MS Teams user is added to conference call |
| 22 | Dial-Through | Dial through the SV9100 to PSTN trunk | Pass | Call transits the SV9100. Requires Tie-Line COS 20-14- 02 and 20-14-03 enabled. SBC is responsible for adding trunk access prefix |
| 23 | Dial-Through | Dial through the SV9100 to PSTN trunk and access remote IVR/AA system. Check that DTMF digits are received and analysed OK | Pass | Digits 0-9, # and * OK. |
| 24 | Dial-Through | Send CLI through transit trunks | Pass | Supported if 14-01-24 is enabled and dependent upon support from PSTN network. |