

# Oracle® Enterprise Session Border Controller

## Release Notes



Release E-Cz8.0.0  
F19892-01  
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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

ORACLE®

Oracle Enterprise Session Border Controller Release Notes, Release E-Cz8.0.0

F19892-01

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# About This Guide

The *Release Notes* describe new features, enhancements, supported platforms, upgrade paths, limitations, known issues, resolved issues, and caveats for the Oracle® Enterprise Session Border Controller (E-SBC).

## Documentation Set

The following table describes the documents included in the Oracle® Enterprise Session Border Controller (E-SBC) E-CZ8.0.0 documentation set.

ACLI Configuration Guide	Contains conceptual and procedural information for configuring, administering, and troubleshooting the E-SBC.
Administrative Security Guide	Contains conceptual and procedural information for supporting the Admin Security license, the Admin Security ACP license, and JITC on the E-SBC.
Call Traffic Monitoring Guide	Contains conceptual and procedural information for configuration using the tools and protocols required to manage call traffic on the E-SBC.
FIPS Compliance Guide	Contains conceptual and procedural information about FIPS compliance on the E-SBC.
HMR Guide	Contains conceptual and procedural information for header manipulation. Includes rules, use cases, configuration, import, export, and examples.
Installation and Platform Preparation Guide	Contains conceptual and procedural information for system provisioning, software installations, and upgrades.
Release Notes	Contains information about the E-CZ8.0.0 release, including platform support, new features, caveats, known issues, and limitations.
Time Division Multiplexing Guide	Contains the concepts and procedures necessary for installing, configuring, and administering Time Division Multiplexing (TDM) on the Acme Packet 1100 and the Acme Packet 3900.
Web GUI User Guide	Contains conceptual and procedural information for using the tools and features of the E-SBC Web GUI.

## Related Documentation

The following table describes related documentation for the Oracle® Enterprise Session Border Controller (E-SBC). You can find the listed documents on <http://docs.oracle.com/en/industries/communications/> in the "Session Border Controller Documentation" and "Acme Packet" sections.

Accounting Guide	Contains information about the E-SBC accounting support, including details about RADIUS accounting.
ACLI Reference Guide	Contains explanations of how to use the ACLI, as an alphabetical listings and descriptions of all ACLI commands and configuration parameters.
Acme Packet 1100 Hardware Installation Guide	Contains information about the hardware components and features of the Acme Packet 1100, as well as conceptual and procedural information for installation, start-up, operation, and maintenance.
Acme Packet 3900 Hardware Installation Guide	Contains information about the hardware components and features of the Acme Packet 3900, as well as conceptual and procedural information for installation, start-up, operation, and maintenance.
Acme Packet 4600 Hardware Installation Guide	Contains information about the hardware components and features of the Acme Packet 4600, as well as conceptual and procedural information for installation, start-up, operation, and maintenance.
Acme Packet 6300 Hardware Installation Guide	Contains information about the hardware components and features of the Acme Packet 6300, as well as conceptual and procedural information for installation, start-up, operation, and maintenance.
HDR Resource Guide	Contains information about the E-SBC Historical Data Recording (HDR) feature. This guide includes HDR configuration and system-wide statistical information.
Maintenance and Troubleshooting Guide	Contains information about E-SBC logs, performance announcements, system management, inventory management, upgrades, working with configurations, and managing backups and archives.
MIB Reference Guide	Contains information about Management Information Base (MIBs), Acme Packet's enterprise MIBs, general trap information, including specific details about standard traps and enterprise traps, Simple Network Management Protocol (SNMP) GET query information (including standard and enterprise SNMP GET query names, object identifier names and numbers, and descriptions), examples of scalar and table objects.
Security Guide	Contains information about security considerations and best practices from a network and application security perspective for the E-SBC family of products.

### Revision History

December 2017	Initial Release
January 2018	Removes unsupported platform information
February 2018	<ul style="list-style-type: none"> <li>• Adds the cpu-load item to the "System Tools" section in Known Issues.</li> </ul>
March 2018	<ul style="list-style-type: none"> <li>• Updates the "Known Issues" section to reflect issues fixed in E-CZ800p2.</li> <li>• Adds the Comm Monitor item to Caveats.</li> </ul>

	<ul style="list-style-type: none"> <li>• Adds Caveat stating no VLAN support over Hyper-V</li> <li>• Updates "Provisioning Admin Security" to clarify that you must use <b>setup entitlements</b> to enable Admin Security.</li> </ul>
May 2018	<ul style="list-style-type: none"> <li>• Adds FAX Transcoding as VNF limitation</li> <li>• Clarifies the Media Hairpinning Caveat</li> <li>• Updates the "Known Issues" section to reflect issues fixed in E-CZ800p3.</li> <li>• Adds the High Availability issue and workaround to Caveats.</li> </ul>
June 2018	<ul style="list-style-type: none"> <li>• Removes H323 as VNF limitation</li> <li>• Adds the Time Division Multiplexing bullet to the "Upgrade Caveats" section of the "Upgrade Information" topic.</li> <li>• Adds Pooled Transcoding Caveat.</li> <li>• Adds Pooled Transcoding Known Issue.</li> <li>• Adds the Acme Packet 3900 to the "Upgrade Caveats" topic.</li> </ul>
August 2018	<ul style="list-style-type: none"> <li>• Adds "Older Caveats Fixed in This Release", which includes QoS for transcoded calls caveat.</li> </ul>
October 2018	<ul style="list-style-type: none"> <li>• TLS1.0 not supported by default in compatibility mode</li> </ul>
December 2018	<ul style="list-style-type: none"> <li>• Adds information about DES-CBC cipher deprecation to "Deprecated Support".</li> </ul>
May 2019	<ul style="list-style-type: none"> <li>• Updates Transcoding caveats with Local Media Playback incompatibility.</li> <li>• Updates "Interface Changes" with unsupported configuration.</li> <li>• Updates the Known Issues table.</li> </ul>
June 2019	<ul style="list-style-type: none"> <li>• Adds OCOM incompatibility with IPv6 to known issues.</li> </ul>
August 2019	<ul style="list-style-type: none"> <li>• Updates the "Self-Provisioned Features" and "License-Key Enabled Features" topics to accurately list the Data Integrity (FIPS) feature in the License-Key Enabled Features table.</li> <li>• Adds a Platform Known Issue to the Known Issues topic.</li> </ul>
October 2019	<ul style="list-style-type: none"> <li>• Updates the Known Issues table.</li> </ul>
November 2019	<ul style="list-style-type: none"> <li>• Adds trace tool limitations to "Trace Tools" caveats.</li> </ul>

# 1

## Introduction to E-CZ8.0.0

The Oracle® Enterprise Session Border Controller *Release Notes* provides the following information about E-CZ8.0.0 release:

- Specifications of supported platforms, virtual machine resources, and hardware requirements
- Overviews of the new features and enhancements
- Summaries of known issues, caveats, limitations, and behavioral changes
- Details about upgrades and patch equivalency
- Notes about documentation changes, behavioral changes, and interface changes

## Platforms and Components Support

The following platforms support the Oracle® Enterprise Session Border Controller (E-SBC).

### Acme Packet Engineered Hardware

- Acme Packet 1100
- Acme Packet 3900
- Acme Packet 4600
- Acme Packet 6300

Oracle qualified the following components for deploying the E-CZ8.0.0 release as a Virtual Network Function.

### Qualified Hypervisors

- XEN 4.4: Specifically using Oracle Virtual Machine (OVM) 3.4.2
- KVM: Using version embedded in Oracle Linux 7 with RHCK.  
Note the use of the following KVM component versions:
  - RHCK: 3.10.0-514
  - DPDK: dpdk017.05.2
  - QEMU: qemu-2.9.0
  - i40e: Firmware-version : 5.04, with driver 2.0.19
- VMware: Using ESXI 6.0 u2 on VMware vCenter Server
- Hyper-V in Windows Server 2012 R2 (Generation 1)

### Qualified Hardware Platforms for Hypervisors:

- Netra X5-2

### Qualified Interface chipsets

- Intel x540/82599
- Intel i350
- Intel X710 / XL710

Firmware version information from dpdk.org is also presented, based on the DPDK version used in this release.

#### Intel x540/82599

- (Intel(R) Ethernet Controller X540-AT2)
- Firmware version: 0x80000389
- Device id (pf): 8086:1528
- Driver version: 3.23.2 (ixgbe)
- Intel(R) 82599ES 10 Gigabit Ethernet Controller
- Firmware version: 0x61bf0001
- Device id (pf/vf): 8086:10fb / 8086:10ed
- Driver version: 4.0.1-k (ixgbe)

#### Intel i350 (On Acme Packet 1100 and Acme Packet 3900 platforms:

- Intel(R) Corporation I350 Gigabit Network Connection
- Firmware version: 1.48, 0x800006e7
- Driver version: 5.2.13-k (igb)

#### Intel X710 / XL710

- Intel(R) Ethernet Converged Network Adapter X710-DA4 (4x10G)
- Firmware version: 5.05
- Device id (pf/vf): 8086:1572 / 8086:154c
- Driver version: 1.5.23 (i40e)
- Intel(R) Ethernet Converged Network Adapter X710-DA2 (2x10G)
- Firmware version: 5.05
- Device id (pf/vf): 8086:1572 / 8086:154c
- Driver version: 1.5.23 (i40e)

### Qualified Interface Input-Output Modes

- PV (VIF on XEN)
- SR-IOV (See "Virtual Network Function (VNF) Caveats.")
- PCI Passthrough (See "Virtual Network Function (VNF) Caveats.")

## Virtual Machine Platform Resources

An OCSBC and OCSR virtual machine requires CPU core, memory, disk size, and network interfaces specified for operation. The system uses the Data Plane Development Kit (DPDK) for datapath design, which imposes VNF-specific resource requirements for CPU cores. Deployment details, such as the use of distributed DoS protection, specify resource utilization beyond the defaults.

The user configures CPU core utilization from the CLI based on their deployment. The user can also define memory and hard disk utilization based on deployment, but must configure the hypervisor with these settings prior to startup if they need them to be different than the machine defaults setup by the machine template (OVA).

### Default VM Resources

VM resource configuration defaults to the following:

- 4 CPU Cores - specific to deployment (See *Core Configuration* in this document)
- 8 GB RAM
- 40 GB hard disk (pre-formatted)
- 8 interfaces as follows:
  - 1 for management (wancom0 )
  - 2 for HA (wancom1 and 2)
  - 1 spare
  - 4 for media

### Interface Host Mode

The Oracle® Enterprise Session Border Controller S-CZ7.3.9 VNF supports interface architectures using Hardware Virtualization Mode - Paravirtualized (HVM-PV):

- ESXi - No manual configuration required.
- KVM - HVM mode is enabled by default. Specifying PV as the interface type results in HVM plus PV.
- XEN (OVM) - The user must configure HVM+PV mode.

### CPU Core Resources

The Oracle® Enterprise Session Border Controller S-CZ7.3.9 VNF requires an Intel Core2 processor or higher, or a fully emulated equivalent including 64-bit SSSE3 and TSC support.

If the hypervisor uses CPU emulation (qemu etc), Oracle recommends that the deployment passes the full set of host CPU features to the VM.

## Virtual Network Function (VNF) Limitations

Oracle® Enterprise Session Border Controller (E-SBC) functions not available in VNF deployments of this release include:

- Native transcoding for codecs other than G.711, G.729 and AMR.  
Workaround: For all other codecs, configure your environment and system for pooled transcoding.

- Inband DTMF detection
- DTMF generation
- FAX Detection
- RTCP generation for G.711 or G.729
- RTCP detection
- MSRP functionality
- TSCF functionality
- Remote Packet Trace
- ARIA Ciphers
- IPSec functionality not available in VNF deployments of this release:
  - IKEv1
  - Authentication header (AH)
  - The AES-XCBC authentication algorithm
  - Dynamic reconfiguration of security-associations
  - Hitless HA failover of IPSec connections.

## Image Files and Boot Files

### For Engineered Hardware

Use the following files for new installations and upgrades on Acme Packet platforms.

- Image file: `nnECZ800.bz`.
- Bootloader file: `nnECZ800.boot`.

### For Virtual Machines

The E-CZ8.0.0 release includes distributions suited for deployment over hypervisors. Download packages contain virtual machine templates for a range of virtual architectures. Use the following distributions to deploy the E-SBC as a virtual machine:

- `nnECZ800-img-vm_ovm.ova`—Open Virtualization Archive (.ova) distribution of the E-SBC VNF for Oracle (XEN) virtual machines.
- `nnECZ800-img-vm_kvm.tgz`—Compressed image file including E-SBC VNF for KVM virtual machines.
- `nnECZ800-img-vm_vmware.ova`—Open Virtualization Archive (.ova) distribution of the E-SBC VNF for ESXi virtual machines.

The Oracle (XEN) Virtual Machine, KVM, and ESXi packages include:

- Product software—Bootable image of the product allowing startup and operation as a virtual machine. This disk image is in either the `vmdk` or `qcow2` format.
- `usbc.ovf`—XML descriptor information containing metadata for the overall package, including identification, and default virtual machine resource requirements. The `.ovf` file format is specific to the supported hypervisor.

- `legal.txt`—Licensing information, including the Oracle End-User license agreement (EULA) terms covering the use of this software, and third-party license notifications.

## Boot Loader Requirements

Oracle® Enterprise Session Border Controller (E-SBC) platforms require a boot loader to load the operating system and application software. New software releases include the corresponding boot loader, which the E-SBC launches during application installation. Note that software upgrades do not update the boot loader. You must manually set the compatibility. For example, suppose you want to install the software image with the filename `nnECZ810.bz`. Use the corresponding boot loader file named `nnECZ810.boot`. From the command line, use the **show version boot** command to view the boot loader version. You must install the boot loader file as `/boot/bootloader` on the target system.

### Stage 1 and Stage 2 Boot Loaders

As of E-CZ8.0.0, you no longer need to confirm Stage 1 and Stage 2 boot loader versions because they are either installed at the factory in the new Acme Packet hardware or embedded into the default deployment templates for virtual machines.

### Stage 3 Boot Loader

Every new software release includes the system software image and the Stage 3 boot loader. All platforms require the Stage 3 boot loader, and the Stage 3 boot loader is compatible with previous releases. Oracle recommends that you upgrade the Stage 3 boot loader before booting the new system image.

## Upgrade Information

Oracle recommends that you review the following information before upgrading to the ECZ8.0.0 release.

### Acme Packet 3900 Upgrade Paths

The E-CZ8.0.0 release supports the following online upgrades:

- E-CZ7.4.0m1 to E-CZ8.0.0
- E-CZ7.5.0x to E-CZ8.0.0

### Acme Packet 1100, Acme Packet 4600, and Acme Packet 6300 Upgrade Paths

The E-CZ8.0.0 release supports the following online upgrades:

- E-CZ7.5.0x to E-CZ8.0.0
- E-CZ7.3.0x to E-CZ8.0.0

### Upgrade Caveats

- Acme Packet 1100, Acme Packet 3900, and VNF Platforms—The software TLS and software SRTP features no longer require license keys. After you upgrade either platform to E-CZ8.0.0, you must run the **setup product** command to re-activate the features that formerly depended on license keys.
- Acme Packet 3900—For systems running E-CZ7.4.0GA to E-CZ7.4.0p3, you must upgrade to E-CZ7.4.0M1 and perform a dual reboot before upgrading to E-CZ8.0. If you previously upgraded to E-CZ7.4.0m1 or E-CZ7.5.0 and performed the dual reboot, you do

not need to perform the dual reboot when upgrading to E-CZ8.0.0. Refer to the E-CZ7.4.0 Release Notes for information about upgrading to E-CZ7.4.0M1.

- **FIPS Users Only**—Typically, you change the name of the boot file to the name of the new release by editing the file name. You cannot edit the boot file name when upgrading from E-CZ7.5.0 to E-CZ8.0.0 on the Acme Packet 1100, Acme Packet 3900, and VNF. You must use the **set-boot-file** command to set the new boot file name.
- **Time Division Multiplexing**—Do not set the **replace-uri** action when routing to a TDM interface.

## Self-Provisioned Entitlements and License Keys

You must use either self-provisioned entitlements or license keys to enable the following features. For some features, self-provisioning enables the feature. For others, self-provisioning sets the number of sessions that your license allows for the feature. Some features require you to obtain and install a license key.

### Self-Provisioned Features

Enable the following features with the **setup entitlements** command.

Feature	Type
Administrative security	Enabled or Disabled
Advanced	Enabled or Disabled
SIP sessions	Number of sessions
Advanced security suite (JITC)	Enabled or Disabled

### License-key Enabled Features

Enable the following features by installing a license key in the **system, license** configuration element. Request license keys from the License Codes website at <http://www.oracle.com/us/support/licensecodes/acme-packet/index.html>.

Feature	Type
Royalty-based transcoding codecs	Number of sessions per codec
Data Integrity (FIPS)	Enabled or Disabled

## System Capacities

System capacities vary across the range of Oracle® Enterprise Session Border Controller (E-SBC) platforms. You can query the system for the capacities of a particular platform by executing the **show platform limit** command.

## Transcoding Support

The pooled transcoding feature on the VNF uses an external transcoding E-SBC, as defined in "Co-Product Support," for supported E-SBC for the Transcoding-SBC (T-SBC) role.

Platform	Supported Codecs (by way of codec-policy in the add-on-egress parameter)
Virtual Platforms (with transcoding core)	<ul style="list-style-type: none"> <li>• PCMU</li> <li>• PCMA</li> <li>• G729</li> <li>• G729A</li> <li>• AMR</li> <li>• AMR-WB</li> <li>• PCMU</li> <li>• PCMA</li> <li>• G729</li> <li>• G729A</li> <li>• G711FB</li> <li>• G726</li> <li>• G726-16</li> <li>• G726-24</li> <li>• G726-32</li> <li>• G726-40</li> <li>• G723</li> <li>• G722</li> <li>• GSM</li> <li>• AMR</li> <li>• AMR-WB</li> <li>• iLBC</li> <li>• T.38</li> <li>• CN</li> <li>• Telephone-event</li> <li>• Opus</li> <li>• SILK</li> <li>• EVS</li> </ul>

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Platform	Supported Codecs (by way of codec-policy in the add-on-egress parameter)
Acme Packet 4600, Acme Packet 6300, and Acme Packet 6350	<ul style="list-style-type: none"><li>• PCMU</li><li>• PCMA</li><li>• G729</li><li>• G729A</li><li>• G711FB</li><li>• G726</li><li>• G726-16</li><li>• G726-24</li><li>• G726-32</li><li>• G726-40</li><li>• G723</li><li>• G722</li><li>• GSM</li><li>• AMR</li><li>• AMR-WB</li><li>• iLBC</li><li>• T.38</li><li>• CN</li><li>• Telephone-event</li><li>• EVRC0</li><li>• EVRC</li><li>• EVRC1</li><li>• EVRCB0</li><li>• EVRCB</li><li>• EVRCB1</li><li>• T.38OFD</li><li>• Opus</li><li>• SILK</li><li>• EVS</li></ul>

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## Co-Product Support

The following products and features run in concert with the Oracle® Enterprise Session Border Controller (E-SBC).

### Pooled Transcoding

The E-SBC supports pooled transcoding to conserve resources. Pooled transcoding requires an Access-Session Border Controller (A-SBC) that uses transcoding resources provided by at least one Transcoding-Session Border Controller (T-SBC). When the A-SBC uses the E-CZ8.0.0 software, you can use the following hardware as a T-SBC in a pooled transcoding scenario:

- Acme Packet 4500 (E-CZ7.5.0, only)
- Acme Packet 4600 (E-CZ7.5.0, E-CZ8.0.0, and E-CZ8.1.0)
- Acme Packet 6300 (E-CZ7.5.0E-CZ8.0.0, and E-CZ8.1.0)

### Oracle Communications Session Router

The E-SBC supports the Oracle Communications Session Router.

## Deprecated Support

Oracle recommends that you review the following changes before using the E-CZ8.0.0 release.

- The E-CZ8.0.0 release does not support either the Acme packet 3820 or the Acme Packet 4500.
- Adhering to recent OpenSSL changes intended to eliminate weak ciphers, the system deprecates all DES-CBC ciphers, including:
  - TLS\_DHE\_RSA\_WITH\_DES\_CBC\_SHA
  - TLS\_RSA\_EXPORT1024\_WITH\_DES\_CBC\_SHA

The user should remove any prior SBC version configuration that used these ciphers, and not configure a security profile with the expectation that these ciphers are available. Note also that TLS profiles using the **ALL** (default) value to the **cipher-list** parameter no longer use these ciphers.

## Documentation Changes

Oracle recommends that you review the following documentation changes before using the ECZ8.0.0 release.

### Documentation Set

Changes to The *ACLI Configuration Guide*.

- The Time Division Multiplexing chapter moves into the new *Time Division Multiplexing Guide*.
- The following topics move into the *Admin Security Guide*.
  - Admin Security with ACP
  - Password Policy
  - Two Factor Authentication

## Neighbor Release Patch Equivalency

Patch equivalency indicates which neighboring patch releases are included in the E-CZ8.0.0 release. This information assures you that when upgrading, the E-CZ8.1.0 release includes defect fixes from neighboring patch releases.

E-CZ8.0.0 includes the E-CZ7.5.0p3, E-CZ7.4.0m1p1, and E-CZ7.3.0m2p11 patches.

## Supported SPL Engines

Each release supports a number of versions of the SBC Programming Language (SPL) engine, which is required to run SPL plug-ins on the Oracle® Enterprise Session Border Controller (E-SBC).

This release supports the following versions of the SPL engine.

- C2.0.0
- C2.0.1

- C2.0.2
- C2.0.9
- C2.1.0
- C2.1.1
- C2.2.0
- C2.2.1
- C2.3.1
- C3.0.0
- C3.0.1
- C3.0.2
- C3.0.3
- C3.0.4
- C3.0.6
- C3.0.7
- C3.1.0
- C3.1.1
- C3.1.2
- C3.1.3
- C3.1.4
- C3.1.5
- C3.1.6
- C3.1.7
- C3.1.8
- C3.1.9

Use the `show sp1` command to see the version of the SPL engine running on the E-SBC.

## NIU and Feature Group Requirements

The following tables list the feature groups for all Oracle® Enterprise Session Border Controller (E-SBC) hardware and virtual platforms that require a specific Network Interface Unit (NIU). The left column lists the supported NIUs. The other columns represent feature sets. In the table cells, the check mark character ( ✓ ) indicates a feature set that requires the corresponding NIU listed in the left column. The x character in a table cell indicates a feature set that does not require the NIU. Some cells contain text that says, "Not applicable."

**Table 1-1 Acme Packet 1100 NIU and Feature Group Support Matrix**

NIU	IPSec	SRTP	QoS	Transcoding	ISDN PRI	ISDN BRI	Analog POTS
Acme Packet 1100 Ethernet interface	X	✓	✓	✓ (requires transcoding module)	X	X	X
Acme Packet 1100 TDM interface (single port and quad port)	Not applicable	Not applicable	Not applicable	Not applicable	✓	X	X
Acme Packet 1100 Euro ISDN BRI interface	Not applicable	Not applicable	Not applicable	Not applicable	X	✓	X
Acme Packet 1100 Analog POTS interface	Not applicable	Not applicable	Not applicable	Not applicable	X	X	✓

**Table 1-2 Acme Packet 3900 NIU and Feature Group Support Matrix**

NIU	IPSec	SRTP	QoS	Transcoding	ISDN PRI
4x1Gig	✓	✓	✓	✓ (requires transcoding module)	X
Quad-Span TDM interface	Not applicable	Not applicable	Not applicable	Not applicable	✓

**Table 1-3 Acme Packet 4600 NIU and Feature Group Support Matrix**

NIU	IPSec	SRTP	QoS	Transcoding
4x1Gig or 2x10Gig NIU	✓	✓	✓	✓ (requires transcoding module)

**Table 1-4 Acme Packet 6300 NIU and Feature Group Support Matrix**

NIU	IPSec	SRTP	QoS	Transcoding
2x10Gig NIU	✓	✓	✓	✓ Transcoding Carrier Unit

**Table 1-5 Virtual Machine and Feature Group Support Matrix**

	IPSec	SRTP	QoS	Transcoding
Virtual Machine	✓	✓	✓	✓ (AMR, G729, PCMU, PCMA)

## OESBC Features Not Available for the OCSBC

The Oracle® Enterprise Session Border Controller (OESBC) supports certain features that the Oracle® Communications Session Border Controller (OCSBC) does not support.

The following list identifies the features that are unique to the OESBC.

- Support for Acme Packet 1100 and Acme Packet 3900 platforms
- LDAP support (Active Directory based call routing)
- Secure access for SDM over TLS
- Dual Network Address Translation (NAT)
- Telephony fraud prevention
- Microsoft Lync and Skype for Business certification
- Enterprise SPL plug-ins
  - SIPREC Extension Data SPL
  - Local Media Playback SPL
  - Configuration Import and Export SPL
  - Lync Emergency Call SPL
  - Universal Call Identifier SPL
  - Comfort Noise Generation SPL
  - Emergency Location Identification Number Gateway SPL
  - Avaya Session Manager Redundancy SPL
- Web GUI Capabilities
  - SIP monitoring tool
  - ISBC
  - Dashboard
  - Basic and Expert configuration modes
  - Configuration wizard
- FIPS certification
- H.323 routing enhancements
- Suite B cryptography
- PKCS 12 container import and export
- Avaya enhancements
  - Personal Profile Manager (PPM) support

- Dual registrations

# 2

## New Features in the Oracle Enterprise E-CZ8.0.0 Release

The E-CZ8.0.0 release includes the following new features.

### Support for Additional TDM Interface Types

In some deployments, Oracle® Enterprise Session Border Controller (E-SBC) customers need the Acme Packet 1100 to support the Base Rate Interface (BRI) and Foreign Exchange Office-Foreign Exchange Subscriber (FXO-FXS) interfaces to help reduce the cost of deploying session border controllers and to connect to analog devices such as fax machines and alarm systems. Some deployments also require the Acme Packet 1100 to support fax transcoding, onboard echo cancellation, FXO tuning, and enhanced routing for Time Division Multiplexing (TDM) traffic.

#### **BRI**

The Acme Packet 1100 supports the optional analog Euro-ISDN Basic Rate Interface (BRI) interface for lower call-volume customers who want to connect their BRI Lines, analog trunk lines, analog phones, fax machines, and other analog communications devices to their IP PBX/IP telephony systems. The BRI interface supports two b-channels for voice and user data at 128 Kbit/s, one d-channel for signaling, and includes an onboard echo canceler to help to improve voice quality.

#### **FXO-FXS**

The Acme Packet 1100 supports using Foreign Exchange Office-Foreign Exchange Subscriber (FXO-FXS) interfaces in the U.S. to connect analog devices, such as fax machines, to a VoIP network. Enterprises also use the FXO-FXS interfaces to connect the E-SBC to legacy analog telephone lines, such as PBX and POTS phone service. The FXO-FXS interfaces provide a way for you to direct traffic to a specific analog endpoint by creating a unique profile per channel. FXO-FXS support requires the optional transcoding Digital Signaling Processor (DSP) for reliable fax transmission with transcoding.

The Acme Packet 1100 supports FXO port tuning because the onboard echo canceler might not work efficiently under some circumstances. For example, the hybrids on the analog line cause echo while converting between two and four wires, and the long cable plants yield imperfect impedance matches. Tuning the FXO ports can reduce the echo and mitigate the quality issues by calibrating the line impedance, which helps the echo canceler to work more efficiently. Oracle recommends tuning the FXO port whenever you detect an audible voice quality issue.

#### **Fax Transcoding**

When equipped with the Foreign Exchange Office-Foreign Exchange Subscriber (FXO-FXS) interface and a transcoding Digital Signal Processor (DSP), the Acme Packet 1100 can transcode analog fax calls into the T.38 codec for better transmission quality. When the DSP detects Fax tones, it triggers the E-SBC to request the Fax gateway to switch to the T.38 codec. You must configure the E-SBC by way of codec policies, local policies, and realm

configurations, to accept the T.38 codec and enable the DSP detect the fax tone to trigger the codec negotiation.

### Enhanced Routing

Each TDM, FXO, and FSO profile includes the **route-group** parameter for assigning the profile to a group for routing.

## Overlap Dialing for Call Routing

Some countries use variable length numbers in call plans, which can cause the Oracle® Enterprise Session Border Controller (E-SBC) to trigger the SIP INVITE before all of the digits arrive. Overlap dialing provides a mechanism that the Acme Packet 1100 and Acme Packet 3900 can use in a Time Division Multiplexing (TDM)-to-SIP deployment to wait for all of the digits and answer a Q.931 SETUP message with the SETUP ACKNOWLEDGE instead of an immediate PROCEEDING or ALERTING message.

Without overlap dialing enabled, the Acme Packet 1100 and Acme Packet 3900 consider only the digits in the SETUP message and ignore subsequent digits. The behavior causes the Acme Packet 1100 and Acme Packet 3900 to build the SIP INVITE too soon and the SIP call either stops or connects to the wrong destination.

With overlap dialing enabled, the Acme Packet 1100 and Acme Packet 3900 can work with the information in the SETUP message. When the SETUP message contains no "Sending Complete" element, the system waits for three seconds to receive an additional digit. Each additional digit restarts the digit collection timer until all digits are collected. The system creates the SIP INVITE only after collecting all of the digits, resulting in successful calls.

In some circumstances, even three seconds might be too short to collect all of the digits. The system may need more time, but the underlying hardware does not allow you to alter the digit collection time span. You can extend the digit collection time span by way of the software with the **incoming-pattern** parameter in the **tdm-profile** configuration. When the collected digits do not map to a pattern, for example when a number is longer than the pattern, the system triggers a longer timer. With the **incoming-pattern** set, the system can respond in the following ways:

- The number does not match any pattern—The digit collection timer waits up to eight seconds for more digits. If the timer expires before collecting the necessary digits, the system releases the call. If the system receives more digits, the extension matching procedure repeats.
- The number matches a pattern and there might be enough digits received to route the call, but the match is still ambiguous—The digit collection timer waits three seconds for more digits. If the timer expires, the system sends the SIP INVITE. If the system receives more digits, the extension matching procedure repeats.
- The number matches, does not allow any more digits, and no other pattern would match even if more digits were received—The system sends the SIP INVITE without waiting.

### Configuration

The configuration process includes setting the following parameters in the **tdm-profile** element:

- Set the **overlap-dial** parameter to **incoming** to enable overlap dialing.
- Specify the match pattern in the **incoming-pattern** parameter. See "Incoming Call Patterns for TDM" for rules and syntax.

 **Note:**

Overlap dialing does not prevent **en-bloc** dialing from working.

**Supported Platforms**

Acme Packet 1100—with the single-port or four-port PRI interface, the four-port Euro ISDN BRI interface, and the analog interface

Acme Packet 3900—with the four-port PRI interface.

## Software Watchdog and Monitoring Timer

The Oracle® Enterprise Session Border Controller (E-SBC) software provides a watchdog to monitor software threads at regular intervals to help you understand the health of the system and to aid root cause analysis of unsuccessful calls. The software watchdog detects unresponsive threads and responds with a configurable action, such as generating a log file or a core file or rebooting. The software watchdog timer controls the frequency of software watchdog monitoring through an internal algorithm and a configurable interval setting.

The system launches the software watchdog by way of the **tHealthCheckd** task upon boot up and begins monitoring threads registered to the **threadHealthCheckList**. Each registered thread periodically updates its health on an interval that you can set with the **task\_health\_check\_time** option in **system-config**. Note that the **tHealthCheckd** task monitors only registered applications, and does not monitor any platform tasks.

When a thread returns a health reference count of 0, the system defines the thread as unresponsive. The software watchdog responds with the **sw-health-check-action** that you set in **system-config**.

You can exclude threads from monitoring with the **sw-health-check-exclude** option in **system-config**.

## Hyper-V Support

You can deploy the E-CZ8.0.0 release as a Virtual Network Function (VNF) over Hyper-V.

## FIPS 140-2 and JITC Compliance

The E-CZ7.8.0 release includes the following support for Federal Information Processing Standards (FIPS) and Joint Interoperability Test Command (JITC) compliance.

**FIPS 140-2 Compliance**

The Acme Packet 1100, Acme Packet 3900, Acme Packet 4600, Acme Packet 6300, and VME support FIPS 140-2 compliance, as follows. See the *FIPS Compliance Guide*.

- AP1100 FIPS 140-2 Level 2
- AP3900 FIPS 140-2 Level 2
- AP4600 FIPS 140-2 Level 2
- AP6300 FIPS 140-2 Level 1

- VMWare FIPS 140-2 Level 1

### JITC Compliance

All Acme Packet E-SBCs support JITC compliance. See the *Administrative Security Guide*.



#### Note:

As of release E-CZ7.8.0, you enable both the JITC and Admin Security feature sets by way of self-entitlements.

## 10 Second Interim QoS Support

The E-CZ8.0.0 release now supports the 10 second interim QoS function on the Acme Packet 1100 and VME, in addition to existing platforms.

## IPSec Support

The E-CZ8.0.0 release supports IPSec for Virtual Network Function (VNF).

## Interface Changes

Oracle recommends that you review the following information about interface changes before using the E-CZ8.0.0 release.

### TDM Configuration

In previous releases the Time Division Multiplexing (TDM) configuration supported only the PRI interface and only one TDM profile. The **tdm-config** element contained all of the necessary parameters for the profile. The E-CZ8.0.0 release supports the BRI and FXO-FXS interfaces in addition to the PRI interface, and allows multiple profiles. The configuration workflow required changes to accommodate the differences in the various interfaces, and to allow multiple profiles. As of the E-CZ8.0.0 release, the **tdm-config** element contains only the parameters that are common to all TDM configurations and uses sub-elements for configuring the parameters that are unique to the interface in use and for configuring multiple profiles.

- When the system detects either the Primary Rate Interface (PRI) or the Basic Rate Interface (BRI) interface, **tdm-config** displays the **tdm-profile** sub-element.
- When the system detects the FXO-FXS interface, **tdm-config** displays the **fxo-profile** and **fxs-profile** sub-elements.

### SSH Configuration

The E-CZ8.0.0 release adds the **ssh-config** configuration element under **security > admin-security**. Use **ssh-config** to set the SSH and TCP timeout values.

The following table lists and describes the **ssh-config** parameters that you can set.

Parameter	Instructions
rekey-interval	Set the time in minutes after which the E-SBC rekeys an SSH or SFTP session. Range: 60-600. Default: 60.
rekey-byte-count	Set the number of bytes transmitted, in powers of 2, before re-keying an SSH or SFTP session. For example, entering a value of 24 sets this parameter to 2 <sup>24</sup> (16777216) bytes. Range: 20-31. Default: 31.
proto-neg-time	Set the time in seconds to complete the SSH protocol negotiation, establishing the secure connection. Range: 30-60. Default: 60.
keep-alive-enable	Enable the TCP keepalive timer. Valid Values: enabled   disabled. Default: enabled.
keep-alive-idle-timer	Set the interval in seconds between the last data packet sent and the first keepalive probe. Range: 15-1800. Default: 15.
keep-alive-interval	Set the interval in seconds between two successful keepalive transmissions. Range: 15-120. Default: 15.
keepalive-retries	Set the number of retransmission attempts before the E-SBC declares the remote end unavailable. Range: 2-10. Default: 2.

### Audit Log Configuration

In previous releases, the **audit-logging** configuration element under **security > admin-security** included the **syslog-output** parameter that allowed you to send saved audit log information to syslog. The E-CZ8.0.0 release enhances and renames the **syslog-output** parameter. Now called **audit-record-output**, the parameter allows you to send saved audit log information to either syslog, a specified file (the default), or both.

### Provisioning Admin Security

In previous releases, you needed a license key to enable the Admin Security feature set. As of E-CZ8.0.0, you enable the Admin Security feature set by way of self-provisioned entitlements using **setup entitlements**. You must use this method when adding Admin Security and all downstream features on a new system.

#### **action=srtp/srtcp**

ipsec security policies no longer support **action=srtp/srtcp** as a configuration. If you are moving a previous configuration that contains **action=srtp/srtcp** to a system that does not support it, you must remove the entire configuration element and ensure all remaining security policy action parameters are set to **allow**, **ipsec**, or **discard**.

# 3

## Caveats, Known Issues, and Limitations

Oracle provides behavioral information that you need to know about the release in the form of caveats, known issues, and limitations. A caveat describes behavior that you might not expect, and explains why the system works in a certain way. A known issue describes temporarily incorrect or malfunctioning behavior, and often includes a workaround that you can use until Oracle corrects the behavior. A limitation describes a functional boundary or exclusion that might affect your deployment.

### Older Caveats Fixed in This Release

The following caveats have been fixed in ECZ8.0.0:

- QoS reporting is now supported for transcoded calls.

### Caveats

Oracle recommends that you review the following caveats before using the E-CZ8.0.0 release.

#### Virtual Network Function (VNF) Caveats

The following functional caveats apply to VNF deployments of this release:

- OVM does not support the SR-IOV and PCI-passthrough interface modes.
- Default levels for scalability are set to ensure appropriate throttling based on platform capacity factors such as hyper visor type, number and role of CPU cores, available host memory, and I/O bandwidth. In some deployments, the defaults may not be appropriate and throttling may occur at lower or higher call rates than expected. Please contact Oracle Technical Support for details about how to override the default throttles, if required.
- To support HA operations, you must disable MAC anti-spoofing for media interfaces on the host hyper visor/vSwitch/SR-IOV\_PF.
- The X123 supports Lawful Intercept (LI). Virtual platforms do not support PCOM for LI.
- The system may experience occasional VM shutdowns, when running the VNF on KVM (OL7.3) with PCI passthrough interfaces. Such shutdowns do not include any indication that the VNF is rebooting, and do not occur based on any specific VNF behavior or operations. Oracle believes that the hypervisor triggers the VM shutdowns and recommends upgrading to OL7.4, if your system experiences VM shutdowns.
- Virtual LAN (VLAN) tagging is not supported when deploying the OCESBC over the Hyper-V platform.

#### Transcoding - general

Transcoding supports only SIP signaling.

You can use codec policies only with realms associated with SIP signaling.

SIPREC may not be performed on a transcoded call.

Local Media Playback feature is incompatible with any transcoding functionality.

### T.38 Fax Transcoding

T.38 Fax transcoding is available for G711 only, at 10ms, 20ms, 30ms ptimes.

Pooled Transcoding for Fax is unsupported.

### DTMF Interworking

The system does not support RFC 2833 interworking with H.323.

The system does not support SIP-KPML to RFC2833 conversion for transcoded calls.

### H.323 Signaling Support

When H.323 and SIP traffic are run in system, configure each protocol (SIP, H.323) in its own separate realm.

### Interface Utilization Support

The system does not support the Interface Utilization, Graceful Call Control, Monitoring, and Fault Management feature.

### Media Hairpinning

The system does not support media hairpinning for hair-pin and spiral call flows for H.323-SIP calls. (The system does support hair-pinning for SIP-SIP calls.)

### Fragmented Ping Support

The system does not respond to inbound fragmented ping packets.

### Physical Interface RTC Support

You must reboot the system after changing any Physical Interface configuration.

### SRTP Caveats

The system does not support Linksys SRTP.

The system does not support MIKEY key negotiation.

### Comm Monitor

Problem: When running SIP Monitor & Trace and Comm-Monitor simultaneously, while the system is passing TLS over TCP calls on a system with high load, the ESBC may fall-over and not reboot. The issue affects all platforms.

Workaround: Run SIP Monitor & Trace or Comm-Monitor individually, not simultaneously.

### The packet-trace command

- The Acme Packet 1100 and Acme Packet 3900 do not support the **packet-trace remote** command.
- Output from the **packet-trace local** command on hardware platforms running this software version might display invalid MAC addresses for signaling packets.
- The **packet-trace remote** command does not work with IPv6.

### Trace Tools

You may only use one of these trace tools at a time:

- **packet-trace** command
- The **communications-monitor** as an embedded probe with the Enterprise Operations Monitor
- SIP Monitor and Trace

### RTCP Generation

The system does not support video flows in realms where RTCP generation is enabled.

### SCTP

SCTP Multihoming does not support dynamic and static ACLs configured in a realm.

You must configure SCTP to use different ports than the TCP ports configured for a given interface.

### High Availability

High Availability (HA) redundancy is unsuccessful when you create the first SIP interface, or the first time you configure the Session Recording Server on the Oracle® Enterprise Session Border Controller (E-SBC). Oracle recommends that you perform the following work around during a maintenance window.

1. Create the SIP interface or Session Recording Server on the primary E-SBC, and save and activate the configuration.
2. Reboot both the Primary and the Secondary.

### Pooled Transcoding

The following media-related features are not supported in pooled transcoding scenarios:

- Lawful intercept
- 2833 IWF
- Fax scenarios
- RTCP generation for transcoded calls
- T.140-Baudot Relay
- OPUS/SILK codecs
- SRTP and Transcoding on the same call
- Asymmetric DPT in SRVCC call flows
- Media hairpinning
- QoS reporting for transcoded calls
- Multiple SDP answers to a single offer
- PRACK Interworking
- Asymmetric Preconditions

## TLS1.0

TLS 1.0 sessions fail to negotiate when the **tls-version** parameter is set to **compatibility**. To advertise TLS1.0 during session negotiation, navigate to the **security-config** element and set the **options** parameter to `+sslmin=tls1.0`.

```
ORACLE(security-config)# options +sslmin=tls1.0
```

# Known Issues

Oracle recommends that you review the following known issues before using the ECZ8.0.0 release.

## General Configuration

ID	Description	Found In	Fixed In
26321175	The ECZ8.0.0 release does not support real-time configuration of the <b>access-control-trust-level</b> parameter in the <b>realm-config</b> element.  Workaround: Make changes to the <b>access-control-trust-level</b> parameter within a maintenance window.	S-CZ7.4.0	TBD

## System Tools

ID	Description	Found In	Fixed In
26323802	The 10s QoS interim feature includes the wrong source IP address as the incoming side of a call flow.  The issue does not prevent successful call and QoS monitoring. For monitoring and debugging purposes, you can find the source IP in the SIP messages (INVITE/200OK).	S-CZ8.0.0p1	TBD
26316821	When configured with the 10 second QoS update mechanism for OCOM, the E-SBC presents the same codec on both sides of a transcoding call in the monitoring packets.  You can determine the correct codecs from the SDP in the SIP Invite and 200 OK.	S-CZ8.0.0p1	TBD
ACMEE SBC-747 5	The <code>cpu-load</code> command does not display the correct value under <code>show-platforms</code> .	E-CZ8.0.0	E-CZ8.0.0p2
26338219	The <b>packet-trace remote</b> command does not work with IPv6.	S-CZ7.4.0	TBD

## Command Output

ID	Description	Found In	Fixed In
26497348	When operating in HA mode, the E-SBC might display extraneous "Contact ID" output from the <b>show sipd endpoint-ip</b> command. You can safely ignore such output.	S-CZ8.0.0	TBD
24574252	The <b>show interfaces brief</b> command incorrectly shows <b>pri-util-addr</b> information in its output.	S-CZ7.4.0	TBD

ID	Description	Found In	Fixed In
26790731	Running commands with very long output, such as the "show support-info" command, over an OVM virtual console might cause the system to reboot.  Workaround: You must run the "show support-info" command only over SSH.	S-CZ8.0.0p1	TBD

### SIP Signaling

ID	Description	Found In	Fixed In
26313330	In some early media call flows, the E-SBC might not present the correct address for RTP causing the call to terminate.	S-CZ8.0.0	E-CZ8.0.0p3
26757626	Issue initially reported by SQA, but subsequently found to be non-reproducible.  In multiple early dialog scenarios, where the INVITE includes the PEM header and the 200OK received from the core does not include SDP, the E-SBC does not anchor media properly.	S-CZ8.0.0	TBD

### Physical Interface

ID	Description	Found In	Fixed In
26281599	The system feature provided by the <b>phy-interfaces overload-protection</b> parameter and <b>overload-alarm-threshold</b> sub-element does not function. Enabling the protection and setting the thresholds does not result in trap and trap-clear events based on the interface's traffic load. The affected ap-smgmt.mib SNMP objects include: <ul style="list-style-type: none"> <li>apSysMgmtPhyUtilThresholdTrap</li> <li>apSysMgmtPhyUtilThresholdClearTrap</li> </ul>	S-CZ7.2.0	S-CZ8.2.0

### Interworking

ID	Description	Found In	Fixed In
27031344	When configured to perform SRTP-RTP interworking, the E-SBC might forward SRTP information in the SDP body of packets on the core side, causing the calls to terminate.  Workaround: Add an appropriately configured media-sec-policy on the RTP side of the call flow. This policy is in addition to the policy on the SRTP side of the call flow.	S-CZ8.0.0p1	TBD

### IPSec

ID	Description	Found In	Fixed In
26669090	The E-SBC dead peer detection does not work with IPv4.	S-CZ8.0.0	TBD

**Accounting**

<b>ID</b>	<b>Description</b>	<b>Found In</b>	<b>Fixed In</b>
21805139	RADIUS Stop records for inter-working function (IWF) calls might display inaccurate values.	S-CZ7.3.0	TBD

**IPv6**

<b>ID</b>	<b>Description</b>	<b>Found In</b>	<b>Fixed In</b>
4809688	Media interfaces configured for IPv6 do not support multiple VLANs.	S-CZ7.3.0	TBD
29931732	The embedded communications monitor probe does not send IPv6 traffic to the Oracle Communications Operations Monitor's mediation engine.	SCZ800	TBD

**H.323**

<b>ID</b>	<b>Description</b>	<b>Found In</b>	<b>Fixed In</b>
	The system does not support SIP-H323 hairpin calls with DTMF tone indication interworking.	S-CZ7.2.0	TBD
	The E-SBC stops responding when you configure an H323 stack supporting SIP-H323-SIP calls with its <b>max-calls</b> parameter set to a value that is less than its <b>q931-max-calls</b> parameter. Workaround: For applicable environments, configure the H323 stack <b>max-calls</b> parameter to a value that is greater than its <b>q931-max-calls</b> parameter.	S-CZ7.4.0	TBD
	The system does not support HA Redundancy for H.323 calls.	N/A	N/A

**High Availability**

<b>ID</b>	<b>Description</b>	<b>Found In</b>	<b>Fixed In</b>
22322673	When running in an HA configuration, the secondary E-SBC might go out of service (OoS) during upgrades, switchovers, and other HA processes while transitioning from the "Becoming Standby" state. Oracle observes such behavior in approximately 25% of these circumstances. You can verify the issue with log.berpd, which can indicate that the media did not synchronize. Workaround: Reboot the secondary until it successfully reaches the "Standby" state.	SCZ7.3.0P1	TBD

**Platforms**

<b>ID</b>	<b>Description</b>	<b>Found In</b>	<b>Fixed In</b>
26432028	On the Acme Packet 1100, Acme Packet 3900, and VME un-encrypted SRTP-SDES calls result in one-way audio. Workaround: None at this time.	E-CZ7.5.0	TBD
28820258	On PNF platforms, when running TLS Chat on VMware-PV 4core (SSFD) + 16GB, TLS Chat sessions are gradually decreasing. When looking in Wireshark at EXFO, EXFO forwards a wrong TLS MSRP Chat payload to EXFO UAS. TCP Chat does not have this error.	E-CZ800	TBD

**Asterisk Behavior**

<b>ID</b>	<b>Description</b>	<b>Found in</b>	<b>Fixed in</b>
25874496	The Asterisk interface on the E-SBC becomes unresponsive. Workaround: Issue a ping command to the Asterisk interface from the E-SBC command line.	E-CZ7.5.0p1	E-CZ8.0.0p2

**Comm Monitor**

<b>ID</b>	<b>Description</b>	<b>Found in</b>	<b>Fixed In</b>
26260953	Enabling and adding Comm Monitor config for the first time can create a situation where the monitoring traffic (IPFIX packets) does not reach the Enterprise Operations Monitor. Workaround: Reboot the system.	E-CZ7.5.0	TBD

**LDAP Server**

<b>ID</b>	<b>Description</b>	<b>Found In</b>	<b>Fixed In</b>
26136553	Issue initially reported by SQA, but subsequently found to be non-reproducible. The E-SBC can incur a system-level service impact while performing a switchover using "notify berpd force" with an LDAP configuration pointing to an unreachable LDAP server. Workaround: Ensure that the E-SBC can reach the LDAP server before performing switchover.	E-CZ7.5.0	TBD

### Telephony Fraud Protection

ID	Description	Found in	Fixed In
25954122	Telephony fraud protection does not black list calls after a failover.  Workaround: Activate the fraud protection table on the newly active server.	E-CZ7.5.0	TBD

### Pooled Transcoding

ID	Description	Found In	Fixed In
28062411	Calls that require SIP/PRACK interworking as invoked by the 100rel-interworking option on a SIP interface do not work in pooled transcoding architectures.	SCZ740	TBD
28071326	Calls that require LMSD interworking as invoked by the lmsd-interworking option on a SIP interface do not work in pooled transcoding architectures. During call establishment, when sending the 200 OK back to the original caller, the cached SDP is not included.	SCZ740	TBD

## Limitations Added and Removed

Oracle recommends that you review the following notes about limitations before using the E-CZ7.8.0 release.

#### Added Limitations

No limitations added for the ECZ8.0.0 release.

#### Removed Limitations

VNF Implementations—Virtual platforms support the following features with no limitations unless otherwise listed in the Caveats and Known Issues sections of this guide.

- IPSec on VNF
- 10 Second QoS on VNF