

Nortel Mobile Communication 3100

Nortel Mobile Communication 3100 Planning and Engineering

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New in this release

The following sections detail what's new in *Nortel Mobile Communication 3100 Planning and Engineering* (NN42030-200) for Nortel Mobile Communication 3100 (MC 3100) Release 3.1.

Navigation

- "Features" (page 5)
- "Other changes" (page 5)

Features

See the following sections for information about feature changes that impact this document:

- "Communication server requirements" (page 5)

For more information on all the new features, see *Nortel Mobile Communication 3100 Fundamentals* (NN42030-109).

Communication server requirements

MC 3100 Release 3.1 supports the following versions of Nortel Communication Server 1000 (CS 1000):

- CS 1000 Release 5.5
  - CS and SS: Deplist of February 3, 2009 or later
  - SPS: SU 5.50.12.006 or later
- CS 1000 Release 6.0
  - Only supported if the Nortel Mobile Communication Gateway 3100 (MCG 3100) runs SU130 or later.
  - latest deplist must be loaded

CS 1000 package requirements are discussed in "CS 1000 package requirements" (page 32).

Other changes

Updated the reference list for new documents.

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Revision history

October 2009	Standard 04.01. This document is issued to support Nortel Mobile Communication 3100 Release 3.1.
July 2009	Standard 03.04. This document is issued to support Nortel Mobile Communication 3100 Release 3.0 and the Communication Server 2100 (CS 2100). Information regarding the CS 2100 is added.
April 2009	Standard 03.03. This document is up-issued to reflect modifications made to support Nortel Mobile Communication 3100 Release 3.0.
October 2008	Standard 03.02. This document is issued to support Nortel Mobile Communication 3100 Release 3.0. Updates were made to clarify use of the Nortel Enterprise Common Manager.
September 2008	Standard 03.01. This document is issued to support Nortel Mobile Communication 3100 Release 3.0.
April 2008	Standard 02.01. This document is issued to support Nortel Mobile Communication 3100 Series Portfolio Release 2.1.
January 2008	Standard 01.11. This document is up-issued to support the Nortel Mobile Communication 3100 Series Portfolio on Nortel Communication Server 1000 Release 5.0 and Nortel Multimedia Communication Server 5100 Release 4.0. It addresses CR Q01806868.
December 2007	Standard 01.10. This document is up-issued to support the Nortel Mobile Communication 3100 Series Portfolio on Nortel Communication Server 1000 Release 5.0 and Nortel Multimedia Communication Server 5100 Release 4.0. It addresses CR Q01798825.
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October 2007	Standard 01.07. This document is up-issued to support the Nortel Mobile Communication 3100 Series Portfolio on Nortel Communication Server 1000 Release 5.0 and Nortel Multimedia Communication Server 5100 Release 4.0. It addresses CR Q01766011 and CR Q01768688.
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September 2007	Standard 01.03. This document is up-issued to support the Nortel Mobile Communication 3100 Series Portfolio on Nortel Communication Server 1000 Release 5.0 and Nortel Multimedia Communication Server 5100 Release 4.0. It addresses CR Q01743268.
September 2007	Standard 01.01. This document is issued to support the Nortel Mobile Communication 3100 Series Portfolio on Nortel Communication Server 1000 Release 5.0 and Nortel Multimedia Communication Server 5100 Release 4.0.

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Overview

This document describes the planning and engineering guidelines for the Nortel Mobile Communication 3100 (MC 3100). The MC 3100 is Nortel's mobility solution for Enterprise networks and consists of a Mobile Communication Gateway 3100 (MCG 3100) server and the Mobile Communications Client 3100 (MCC 3100) application and MC 3100 Web User Interface for mobile devices.

Navigation

- "Planning" (page 9)
- "Engineering" (page 23)
- "License requirements" (page 29)
- "Interworking requirements with CS 1000" (page 31)

References

For more information on MC 3100, see

- *Nortel Mobile Communication 3100 Fundamentals* (NN42030-109)
- *Nortel Mobile Communication 3100 Installation and Commissioning* (NN42030-300)
- *Nortel Mobile Communication 3100 Administration and Security* (NN42030-600)
- *Nortel Mobile Communication Client 3100 for BlackBerry* (NN42030-101)
- *Nortel Mobile Communication Client 3100 for Nokia* (NN42030-102)
- *Nortel Mobile Communication Client 3100 for Windows Mobile* (NN42030-107)
- *Nortel Mobile Communication 3100 Web User Interface User Guide* (NN42030-110)
- *Nortel Mobile Communication 3100 Troubleshooting* (NN42030-700)
- *Nortel Mobile Communication 3100 and Communication Server 1000 Solution Integration Guide* (NN49000-315)

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Planning

This chapter details the planning aspects of the Mobile Communication 3100 (MC 3100).

Navigation

- "MCC 3100 and MC 3100 Web UI network deployment" (page 9)
- "MCG 3100 network deployment" (page 12)
- " Dialing plans and telephone numbers" (page 14)
- "Security requirements" (page 16)
- "High availability" (page 18)
- "Capacity" (page 22)

MCC 3100 and MC 3100 Web UI network deployment

The Mobile Communication Client 3100 (MCC 3100) for BlackBerry, the MCC 3100 for Nokia, the MCC 3100 for Windows Mobile, and the MC 3100 Web User Interface (MC 3100 Web UI) require access to the Mobile Communication Gateway 3100 (MCG 3100). In this document, the terms *MCC 3100* and *clients* refer to the supported clients and MC 3100 Web UI.

The MCC 3100 for BlackBerry supports two network deployment options:

- with the BlackBerry Enterprise Server (BES)
- without the BES

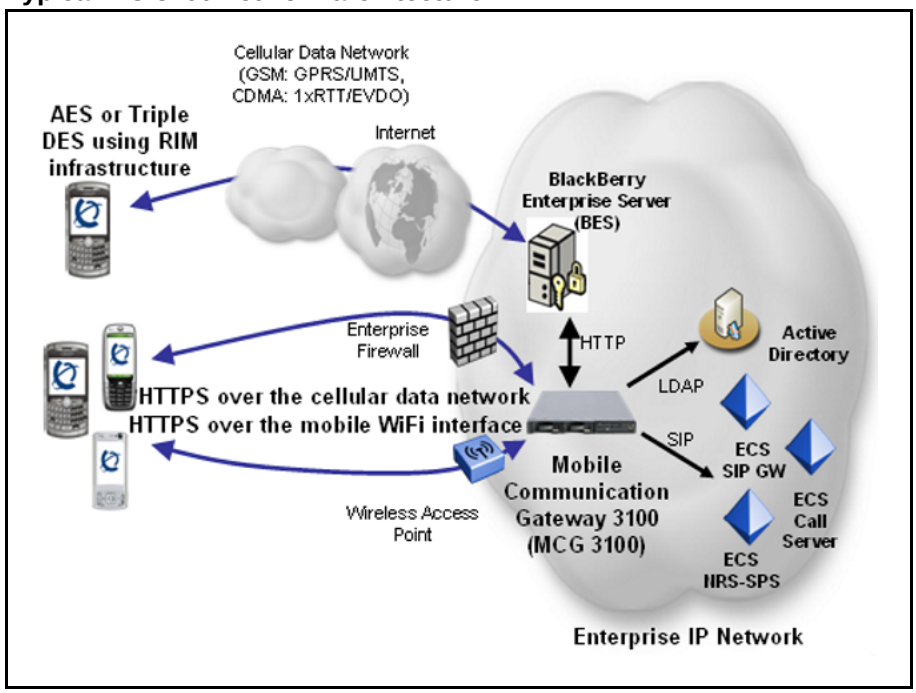
The MCC 3100 for BlackBerry with the BES uses the BES to route data and provide security.

MCC 3100 for BlackBerry (without the BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile require a Wireless Access Point or an internet connection through the Enterprise firewall

Figure 1 "Typical MC 3100 network architecture" (page 10) shows a typical network architecture.

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Figure 1
Typical MC 3100 network architecture



The MCC 3100 for Nokia and MCC 3100 for Windows Mobile do not contain integrated virtual private network (VPN) software. Any industry-standard VPN software for the Nokia or Windows Mobile device can be used.

The MCC 3100 for Nokia and MCC 3100 for Windows Mobile communicate directly to the MCG 3100. When deployed with the BES, the MCC 3100 for BlackBerry communicates with the BES, which communicates with the MCG 3100. When deployed without the BES, the MCC 3100 for BlackBerry communicates directly with the MCG 3100.

The MC 3100 Web UI does not require software installation on the device. When the MC 3100 Web UI is installed on a BlackBerry that uses a BES, the BlackBerry Web browser uses the Mobile Data Service (MDS) on the BES to access the MCG 3100. For the non-BES BlackBerry, and for Windows Mobile and Nokia devices, the MC 3100 Web UI (in the Web browser) uses HTTPS to connect to the MCG 3100.

For examples of MCC 3100 and MCG 3100 call flows, see *Nortel Mobile Communication 3100 Fundamentals* (NN42030-109).

Data network requirements

The clients have different data networking requirements.

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- "MCC 3100 for BlackBerry (with BES)" (page 11)
- "MCC 3100 for BlackBerry (without BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile" (page 11)

MCC 3100 for BlackBerry (with BES)

This section describes the requirements for the MCC 3100 for BlackBerry with the BES. For configurations that do not required the BES, see "MCC 3100 for BlackBerry (without BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile" (page 11).

The Enterprise-hosted BES defines the data networking requirements between the BlackBerry and the BES. On the BES, configure the BlackBerry Mobile Data System (MDS) to enable the MCC 3100 for BlackBerry to route Hypertext Transport Protocol (HTTP) traffic to the BES and then to the MCG 3100 within the Enterprise network.

When you deploy the MCG 3100, data originates from the BES for all of the MCC 3100 for BlackBerry clients. The Research in Motion (RIM) infrastructure manages the boundary between the untrusted and trusted network, making the overall solution deployment less complex.

MCC 3100 for BlackBerry (without BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile

The HTTP Secure (HTTPS) traffic from the public internet (untrusted) into the Enterprise IP network (where the MCG 3100 resides) needs to be considered.

The MCC 3100 for BlackBerry (without BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile support all device security configurations administered by the system administrator.

Certificates to support HTTPS on the BlackBerry, Nokia, and Windows Mobile devices need to be deployed as part of the client deployment process. The BlackBerry, Nokia, and Windows Mobile devices require the MCG 3100 Fully Qualified Directory Name (FQDN) to generate certificates. The FQDN must resolve on both the cell data network (the internet) and on the wireless network that is used by the BlackBerry, Nokia, and Windows Mobile devices to communicate with the MCG 3100.

You can use wireless access in place of cell data access for HTTPS signaling with the MCG 3100. After the client associates with the wireless network, the client has Internet Protocol (IP) access to the MCG 3100.

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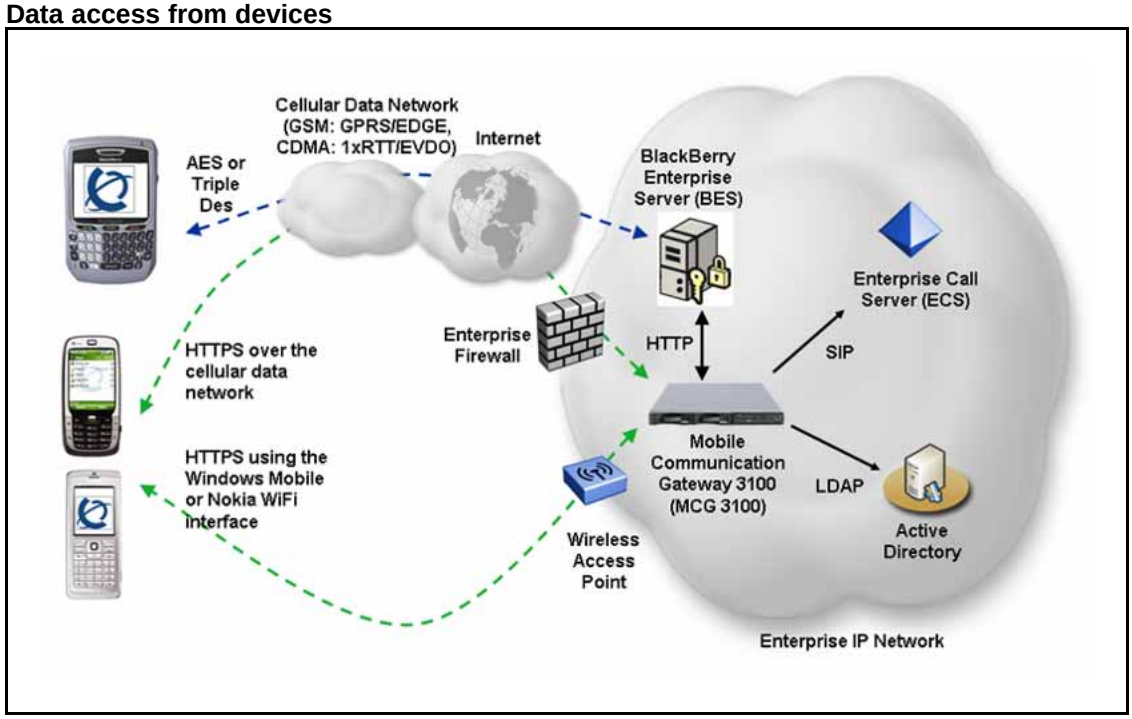
MCG 3100 network deployment

The Mobile Communication Gateway 3100 (MCG 3100) requires the following network infrastructure:

- access to an Enterprise Call Server (ECS) including a call server, Session Initiation Protocol (SIP) gateway, and SIP Proxy Server (SPS)
- access to the ECS Telephony Local Area Network (TLAN), including all SIP infastructure, media gateways, and any IP endpoint that can originate or terminate real-time transport
- access to a BlackBerry Enterprise Server (BES) if the MCG 3100 supports the MCC 3100 for BlackBerry with the BES

Figure 2 "Data access from devices" (page 12) shows data access from the devices.

Figure 2
Data access from devices



For examples of MCC 3100 and MCG 3100 call flows, see *Nortel Mobile Communication 3100 Fundamentals* (NN42030-109).

BlackBerry deployment considerations (with BES)

When the MCC 3100 for BlackBerry deployment includes the Enterprise-hosted BES, additional deployment considerations exist.

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The BES defines the data networking requirements between the BlackBerry device and the BES. The BES configuration must include the BlackBerry Mobile Data System (MDS) to allow the MCC 3100 for BlackBerry to route HTTP traffic to the BES, and then to the Enterprise MCG 3100.

When you deploy the MCG 3100, data originates from the BES for the MCC 3100 for BlackBerry clients. The BES infastructure controls the boundary between the untrusted and trusted network, making the overall deployment less complex.

BlackBerry (without BES), Nokia, and Windows Mobile deployment considerations

The MCG 3100 uses HTTPS over the cellular data network. The MCG 3100 must be deployed so that internet traffic can reach it at the same time that it communicates with the ECS TLAN.

To deploy the MCC 3100 for BlackBerry (without the BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile, determine how to forward the HTTPS traffic from the public internet (untrusted) to the Enterprise IP network where the MCG 3100 resides. Certificates to support HTTPS on the devices must be deployed. The certificates require the MCG 3100 Fully Qualified Domain Name (FQDN). The FQDN must resolve on both the cell data network (internet) and on any wireless network used by the devices to communicate with the MCG 3100.

If desired, you can use wireless access in place of cell data access (internet) for HTTPS signaling with the MCG 3100. In this deployment, the clients have IP access to the MCG 3100 after becoming associated with the wireless network.

Network bandwidth requirements

Use the following sections to calculate the network bandwidth requirements for the MCG 3100.

- "HTTP Signaling" (page 14)
- "SIP signaling bandwidth requirements" (page 14)
- "RTP media bandwidth requirements" (page 14)

Based on the assumptions in these sections, the MCG 3100 supports 1500 users per gateway with a maximum of 350 simultaneous calls on a 100BaseT network.

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HTTP Signaling

For HTTP signaling, make the following assumptions:

- Each mobile client use exchanges approximately 30 megabytes (MB) of signaling data with the MCG 3100 each month.
- With 22 business days per month, each mobile user exchanges approximately 1.36 MB of signaling data per day.
- Signaling traffic takes place for 7.5 hours each business day.
- In the context of streaming data, 1 MB = 1000^2 (not 1024^2 as in the context of computer memory).
- 1.36 MB/7.5 hours = 181 818 bytes/hour = 1 454 545 bits/hour = 404.04 bits/second

Using the above assumptions, if you have X users, then the traffic on the MCG 310 is 404.04 bits/second * X. For 1500 users, the bandwidth required is approximately 606 kilobits per second (kbit/sec).

SIP signaling bandwidth requirements

For the purposes of data modeling, assume that SIP signaling is roughly equivalent to HTPP signaling.

So, using the example of 1500 users, SIP signaling should consume another 600 kilobit/s, assuming an even distribution of calls through the business hours in a given month.

RTP media bandwidth requirements

Each call involving a mobile client has two media streams. One stream goes from the source to the destination through the MCG 3100, and the other goes from the destination to the source through the MCG 3100.

For each call, assuming a G.711 transmission of 64 kilobit/s, media consumes 256 kilobit/s. For 1500 simultaneous calls, this equates to 256 kilobit/s * 1500 = 354 megabit/sec.

A 100 megabit network interface supports at most 390 simultaneous calls. To support signaling and provide a buffer, round this number down to 350 calls.

Dialing plans and telephone numbers

MC 3100 supports telephone numbers in the following formats

- Dial strings, where the user enters all the digits to be dialed. Examples of dial strings include 2356, 63432356, 93432356 and 3432356.
- E.164 Fully Qualified International Numbers, where telephone numbers start with the plus (+) symbol. E.164 Fully Qualified International Numbers are also known as "plus numbers". Examples

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of Fully Qualified International Numbers include +16131234567 and +31123456789.

The dial plan available from MC 3100 should be the same as the dial plan for a desk telephone. That is, if the user has a desk telephone and an MCC 3100 device, the dial plan should be the same.

MC 3100 users should use the E.164 Fully Qualified International Numbers for all stored Public Switched Telephone Network (PSTN) numbers in address books and mobile device applications. By using this format, the numbers can be dialed from any region or country, within the wireless network or from the communication server.

The E.164 Fully Qualified International Numbers ensure that users do not need to be concerned about dial prefixes or long distance codes. The network determines how to place the call, based on the user's location and network connection.

When the user dials an E.164 Fully Qualified International Number, the communication server puts the number in the request Uniform Resource Indicator (URI) of the SIP INVITE message in the following format sip: +CCCXXXXXXXX@domain; user=phone.

When using the ECS, configure the CNTC, NATC, and INTC parameters in LD 15 to support E.164 Fully Qualified International Numbers. These parameters ensure that fully qualified numbers within the same country are dialed as national numbers, and international numbers are prefixed correctly.

Example 1 (Switzerland)
ECS is Nortel Communication Server 1000 (CS 1000)
AC1=0, CNTC=41, NATC=0, INTC=00

Call to a number within Switzerland
A user initiates a call to a contact with the phone number +41123456789.

The URI incoming for the SIP INVITE for the call is sip:+41123456789@domain.com;user=phone

CS 1000 digit processing strips the CNTC and adds <AC1 + NATC> to produce 00123456789

Call to a number outside Switzerland
A user initiates a call to a contact with the phone number +14161234567.

The URI incoming for the SIP INVITE for the call is sip:+14161234567@domain.com;user=phone

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CS 1000 digit processing adds <AC1 + INTC> to produce 00014161234567

Example 2 (North America)
ECS is CS 1000
AC1=6, CNTC=1, NATC=1, INTC=011

Call to a number within North America
A user initiates a call to a contact with the phone number +14161234567.

The URI incoming for the SIP INVITE for the call is sip:+14161234567@domain.com;user=phone

CS 1000 digit processing strips the CNTC and adds <AC1 + NATC> to produce 614161234567

Call to a number outside North America
A user initiates a call to a contact with the phone number +41123456789.

The URI incoming for the SIP INVITE for the call is sip:+41123456789@domain.com;user=phone

CS 1000 digit processing adds <AC1 + INTC> to produce 601141123456789.

Security requirements

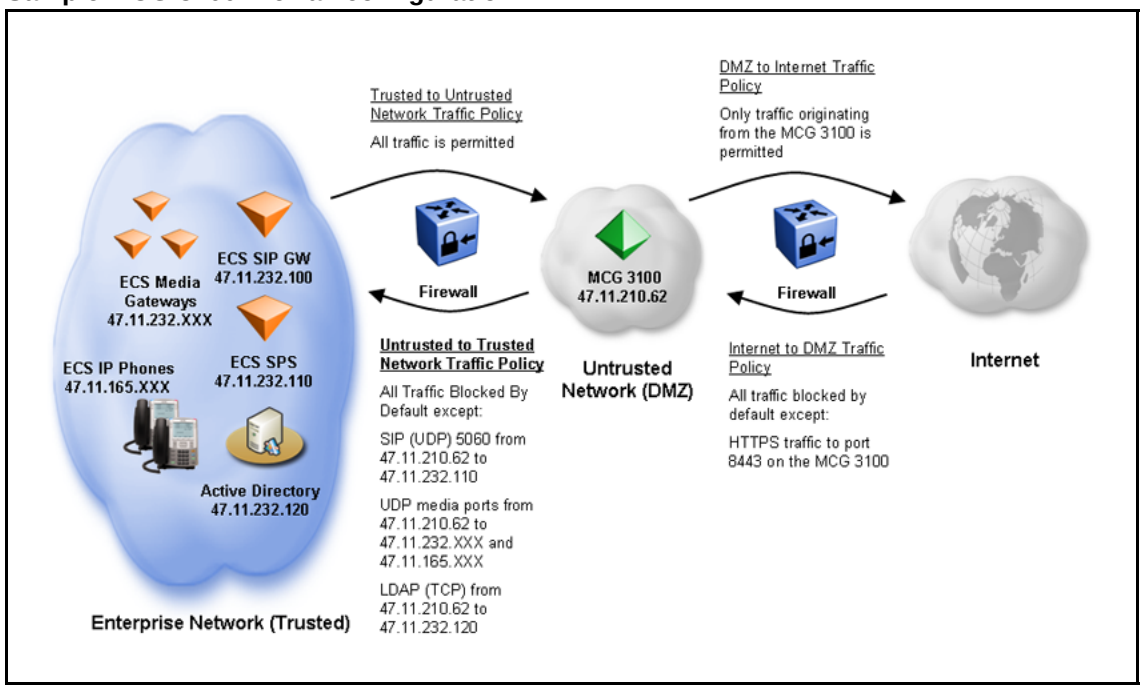
The MCG 3100 requires data access to the ECS TLAN and uses the ECS SIP Proxy Server (SPS) as the SIP Signaling Proxy. The MCG 3100 can accept or transmit real time protocol (RTP) messages to any IP endpoint in the Enterprise (for example, Media Cards, other SIP clients, or IP telephones).

Figure 3 "Sample MCG 3100 firewall configuration" (page 17) shows a firewall that separates the MCG 3100 from the remainder of the Enterprise voice infastructure. The MCC 3100 for BlackBerry (without the BES), MCC 3100 for Nokia, and MCC 3100 for Windows Mobile require access on the internet to a public FQDN and a public IP address. The figure also shows a sample firewall configuration and policy. For the purposes of this example assume

- that the MCC 3100 (in the absence of a BES) requires a public FQDN and IP for the MCG 3100 to be accessible from the internet. This in turn forces the MCG 3100 to be placed in a demilitarized zone (DMZ).
- Firewalls are used to filter traffic from the internet and from the DMZ to separate the MCG 3100 and internet from the trusted Enterprise voice infrastructure where other components on the ECS TLAN reside.

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Figure 3
Sample MCG 3100 firewall configuration



If a user calls a client, the SIP signaling comes through the SPS. Real Time Protocol (RTP) for announcements or MC 3100 Instant Conference calls takes place between the MCG 3100 and the IP telephone without using the SPS.

To allow public internet traffic to reach the MCG 3100 from clients, while simultaneously providing MCG 3100 access to the ECS TLAN for SIP and RTP, you must carefully consider the data network and security requirements of the Enterprise.

Proprietary communication between the MCG 3100 and the MCC 3100 for BlackBerry (without the BES, using HTTP), the MCC 3100 for Nokia (using HTTPS), and the MCC 3100 for Windows Mobile (using HTTPS) enables clients to initiate and modify calls for the user on the ECS. In the BES configuration, the MCC 3100 for BlackBerry communicates with the BES, which communicates with the MCG 3100. The MCC 3100 for Nokia and MCC 3100 for Windows Mobile communicates directly with the MCG 3100, as well as the MCC 3100 for BlackBerry when configured without the BES.

Access to user records in an active directory server configured against the MCG 3100 uses a tunnel over HTTP or HTTPS. Configure the MCG 3100 to specify the query search base, which limits the search to a subtree of the base.

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The MCG 3100 queries a corporate Lightweight Directory Access Protocol (LDAP) server when the users use the Directory lookup feature on their clients. The MCG 3100 supports the following LDAP servers:

- Active Directory/Exchange Server 2000 or 2003
- Nortel Common Network Directory (CND), which is part of Telephony Manager (TM) 3.1 in CS 1000

Password protection

The MC 3100 handles passwords using the following mechanisms:

- The User Endpoint Password is configured by the Administrator on the Network Routing Service (NRS) running in SIP proxy (SPS) mode.
- The MCG 3100 authenticates the user login by attempting to register the user to the NRS.
  - — If the registration attempt succeeds, the MCC 3100 login attempt succeeds.
  - — If the registration attempt fails, the MCC 3100 login attempt fails.

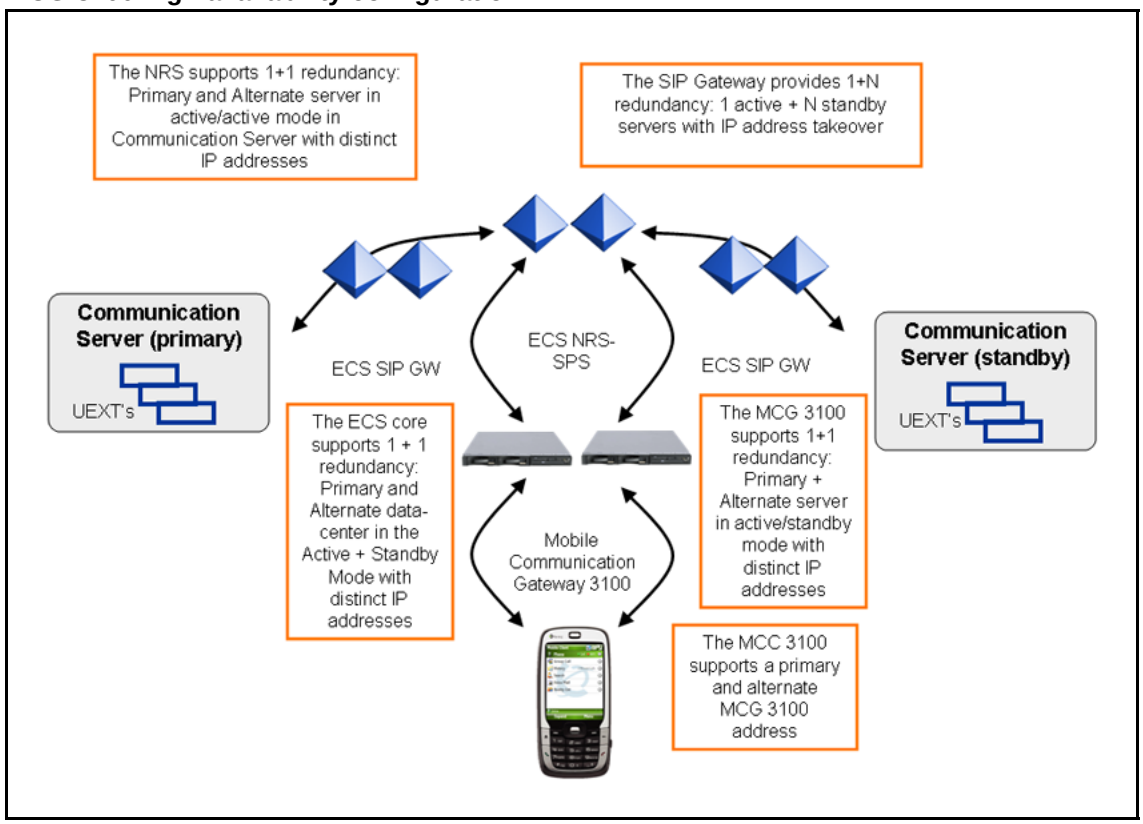
  The NRS uses an MD5 challenge-response exchange, as defined in RFC3261/RFC2617.
- When the MCC 3100 is used on a device that does not access the enterprise through a BES, the administrator can configure the system to use HTTPS. The user password is entered on the device and protected using TLS/AES over the public internet. HTTPS is used end-to-end between the MCG 3100 and the MCC 3100.
- Communication between the BlackBerry and BES are secured using triple DES to secure data traffic over the public internet.
- Traffic between the MCG 3100 and BES uses HTTP, which implies that passwords can be seen in clear text in the XML body of the HTTP messages. Efforts must be taken to minimize the risk by using either an encrypted tunnel or through physical means.

High availability

You can deploy the MCG 3100 as a nonredundant server or in a redundant pair. Figure 4 "MCG 3100 high availability configuration" (page 19) shows the redundant pair configuration that enables the high availability solution.

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Figure 4
MCG 3100 high availability configuration



A redundant system includes an active server and a standby server. Mobile clients access the active server, while the standby server functions as a backup. The two roles switch freely, based on the following rules:

- If the MCG 3100 does not have a configured backup IP address, it starts in active mode.
- If the MCG 3100 has a configured backup IP address, it starts in inactive mode and attempts to locate the standby system.
  - If the standby server is in standby mode, the system with the lower IP address becomes active.
  - If the standby server is in active mode, the standby server remains active.
  - If the standby server is not located, the local system is declared active.
- If the active system stops, the standby system becomes active.

The pair of MCG 3100 servers must contain identical software for redundancy to work. Each server acts as the backup for the other server.

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The clients support MCG 3100 redundancy. The Primary MCG 3100 address and Secondary MCG 3100 address fields in the clients contain the active and standby MCG 3100 IP addresses respectively. When the active MCG 3100 stops responding, the clients switch to the other MCG 3100.

Attention: The communication link between two MCG 3100 servers in the redundant pair must be highly reliable and available. When the gateways cannot communicate with each other, they both become active, start processing traffic, and try to register with the NRS. The NRS has only one gateway endpoint associated with the MCG 3100, so the second gateway to register with the NRS receives all the incoming SIP traffic.

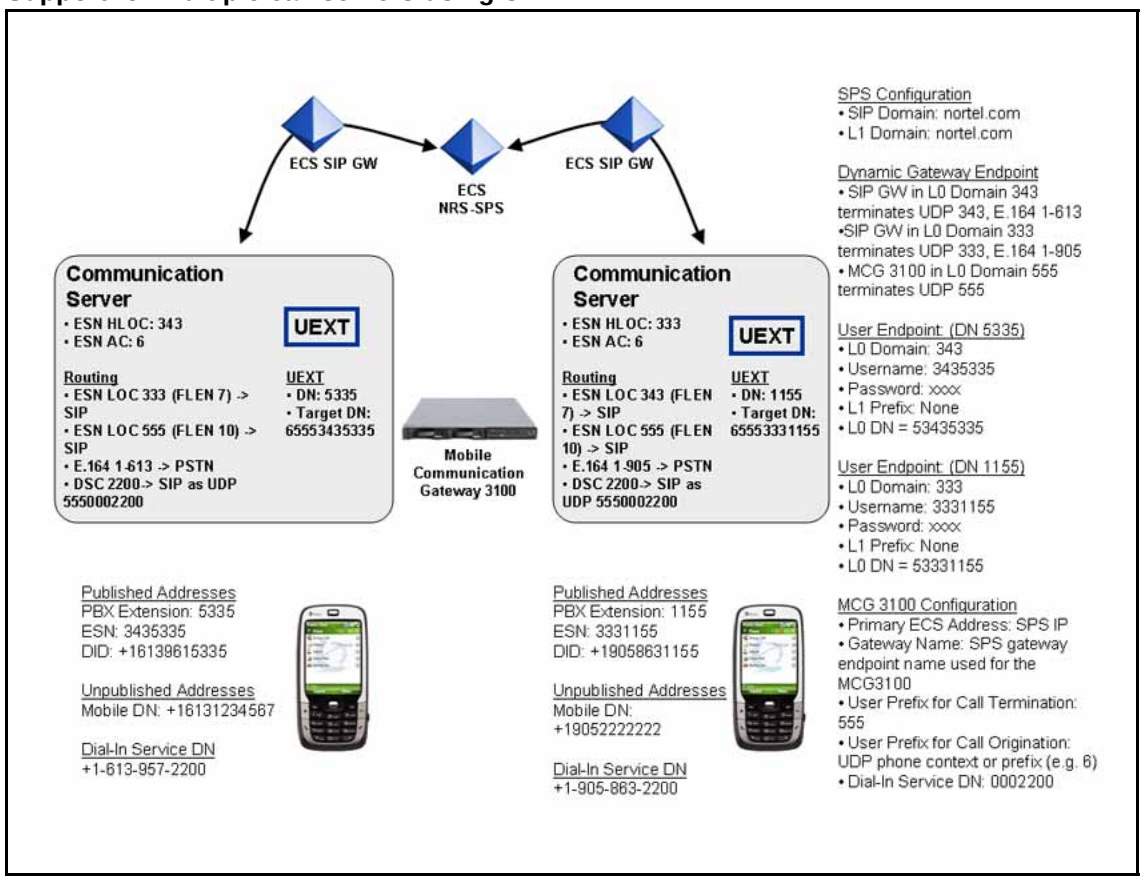
MCG 3100 and Enterprise Communication Server high availability

A single MCG 3100 can support multiple call servers using the Source Based Routing (SBR) functionality on the NRS-SPS . For more information about SBR, see "CS 1000 Source Based Routing" (page 32).

When the MCG 3100 sends an INVITE with the SBR tag, the SPS uses the configured routing translations to route the call to the originators home call server. Figure 5 "Support for multiple call servers using UDP" (page 21) shows a Universal Dialing Plan (UDP) example and Figure 6 "Support for multiple call servers using CDP " (page 22) shows a Coordinated Dialing Plan (CDP) example of high availability call servers.

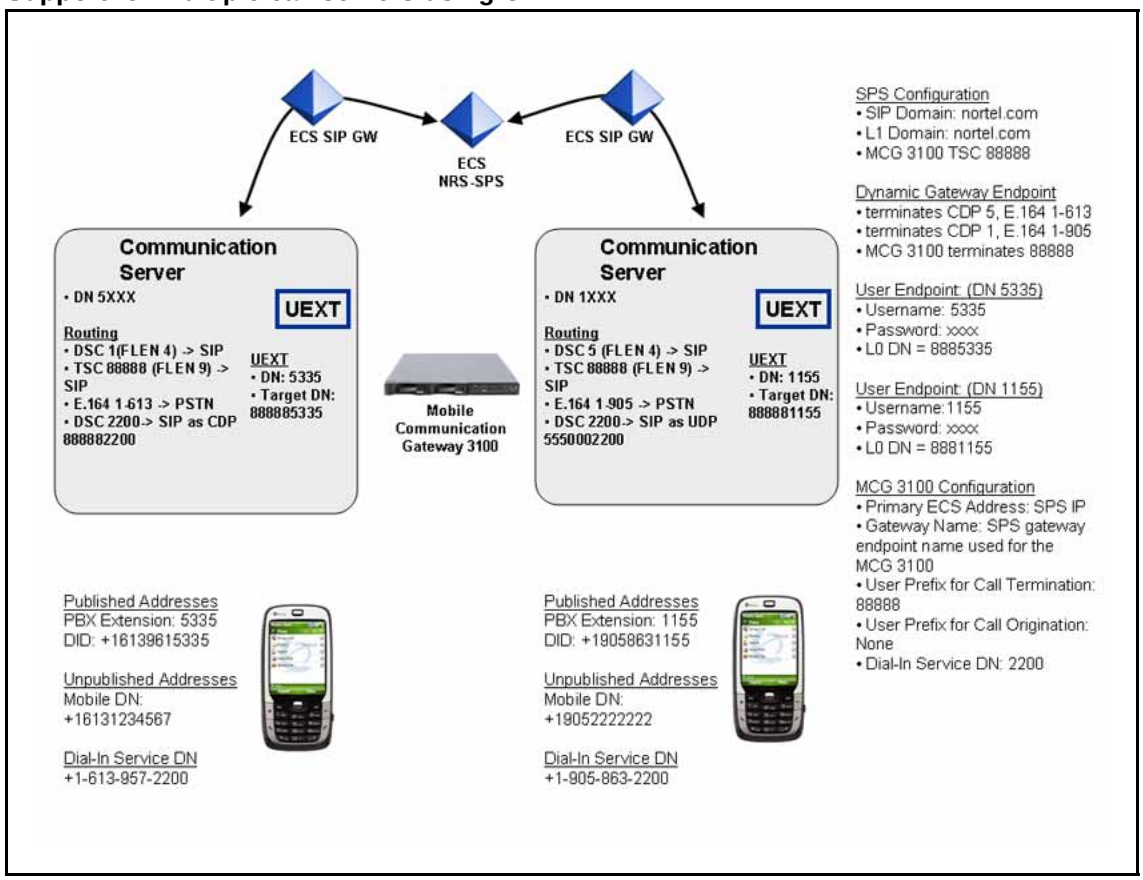
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Figure 5
Support for multiple call servers using UDP



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Figure 6
Support for multiple call servers using CDP



In an ECS high availability configuration, the MCG 3100 sends a message to the Primary SPS. If the message

- succeeds, the MCG 3100 uses the Primary SPS and sends a message every 20 seconds to check its availability.
- fails, the MCG 3100 attempts to connect to the Secondary SPS.
  - — If the Secondary SPS responds, the MCG 3100 connects to the Secondary SPS. However, it continues to check the Primary SPS availability every 20 seconds and reconnects to the Primary SPS as soon as possible.
  - — If the Secondary SPS does not respond, the MCG 3100 declares itself out-of-service.

Capacity

The MCG 3100 supports 1500 users per gateway. Nortel testing used a capacity of 8000 calls per hour. The 1500 users per gateway capacity recommendation assumes each user makes on average four calls per hour (or approximately 6000 calls per hour). This results in a margin of safety for the capacity of the MCG 3100 when servicing 1500 users per gateway.

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Engineering

This chapter details the engineering aspects of the Mobile Communication 3100 (MC 3100).

Navigation

- "Client device specifications" (page 23)
- "Gateway specifications" (page 23)
- "Port tables" (page 23)

Client device specifications

The Mobile Communication Client 3100 (MCC 3100) application runs on a number of devices. These devices have no special hardware or software requirements.

To view the list of supported devices, see the MC 3100 Product Bulletin at www.nortel.com.

Gateway specifications

The Mobile Communication Gateway 3100 (MCG 3100) uses one of the following servers:

- HP DL320G4
- IBM x306m

The MCG 3100 runs on the CS 1000 Linux base operating system. For more information, see *Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

Port tables

The following table details the ports used in the MCG 3100. When using this section to configure firewalls, refer to Figure 3 "Sample MCG 3100 firewall configuration" (page 17).

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Table 1
MCG 3100 ports

Port	Protocol	Function	Applica-tion	Configur-able?	Configure in MCG 3100-to-Enterprise Firewall policy?	Configure in Internet-to-MCG 3100 Firewall policy?
21	Transmission Control Protocol (TCP)	File Transfer Protocol (FTP)	Base Linux	No	No	No
22	TCP	Secure Shell (SSH)	Base Linux	No	No	No
53 (Send only)	User Datagram Protocol (UDP)	Domain Name Server (DNS) queries to external DNS server	Base Linux	No	Yes, assuming DNS is within the Enterprise network	No
123 (Send only)	TCP	Network Time Protocol (NTP)	Base Linux	No	Yes, assuming DNS is within the Enterprise network	No
389 (Send only)	LDAP (TCP)	Directory access	Directory access	Yes	Yes	No
1098	TCP	Communication between the MCG 3100 Administration server and the MCG 3100 Gateway server	MCG 3100	No	No	No
1099	TCP	Communication between the MCG 3100 Gateway server and the MCG 3100 Administration server	MCG 3100	No	No	No

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Table 1
MCG 3100 ports (cont'd.)

Port	Protocol	Function	Application	Configurable?	Configure in MCG 3100-to-Enterprise Firewall policy?	Configure in Internet-to-MCG 3100 Firewall policy?
3306	TCP	SQL Client Access	MySQL	No	No	No
5060	Session Initiation Protocol (SIP) (UDP)	MCG 3100 listen port for Voice over IP (VoIP) Signalling	MCG 3100	Yes	Yes	No
5072	SIP (UDP)	MCG 3100 listen port for VoIP Signalling (Instant Call Server)	MCG 3100	Yes	Yes	No
7800	TCP	MCG 3100 Data Replication	MCG 3100	No	No	No
8008	HTTP (TCP)	Licensing validation with www199.nortel.com	MCG 3100	No	No	No
8080	TCP	MCC 3100 open client interface	MCC 3100	Yes 8080 to 8089	No	Yes
8282	HTTP (TCP)	MCG 3100 Open Web Admin Interface (standalone management only)	MCG 3100 Web Administration Console	No	No	No
8443	HTTPS (TCP)	MCC 3100 Secure Client Interface	MCG 3100	Yes 8440 to 8449	No	Yes
8553	TCP	MCG 3100 Secure Admin Interface (standalone management only)	MCG 3100 Admin	No	No	No

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Table 1
MCG 3100 ports (cont'd.)

Port	Protocol	Function	Application	Configurable?	Configure in MCG 3100-to-Enterprise Firewall policy?	Configure in Internet-to-MCG 3100 Firewall policy?
9800	TCP	MCG 3100 Gateway Server Java Virtual Machine (JVM)	MCG 3100 Gateway JVM	No	No	No
9801	TCP	MCG 3100 Administration JVM	MCG 3100 Admin JVM	No	No	No
26000 to 26099 (listen only)	UDP	Media for all MCC 3100 calls anchored on the MCG 3100	Voice over IP (VoIP) Conference Media	Yes	Yes	No
27000 to 27099 (listen only)	RTP (UDP)	Media for all MCC 3100 calls anchored on the MCG 3100	VoIP Media	Yes	Yes	No

In the preceding table, the ranges 26000 to 26999 and 27000 to 27999 depend on the configuration of the Maximum number of DTR ports parameter.

The following table lists the ports that are defined by the Enterprise Call Server (ECS). You configure these ports on the ECS.

Table 2
ECS ports

Protocol	Function	Application	Configure in the MCG 3100-to-Enterprise Firewall policy?	Configure in the Internet-to-MCG 3100 Firewall policy?
RTP (UDP)	VoIP send port for the Gateway server. Configured on the MCG 3100.	MCG 3100	Yes	No

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Table 2
ECS ports (cont'd.)

Protocol	Function	Application	Configure in the MCG 3100-to-Enterprise Firewall policy?	Configure in the Internet-to-MCG 3100 Firewall policy?
RTP (UDP)	VoIP send port for the Instant Conference Server. Configured on the MCG 3100.	MCG 3100	Yes	No
RTP (UDP)	VoIP send port for the VoIP Conference Media. RTP can be sent to media gateways, IP endpoints, or other SIP User Agents. The range of end point ports defines the ports to which the MCG 3100 sends media.	MCG 3100	Yes	No
RTP (UDP)	VoIP send port for Media. RTP can be sent to media gateways, IP endpoints, or other SIP User Agents. The range of end point ports defines the ports to which the MCG 3100 sends media.	MCG 3100	Yes	No

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License requirements

This chapter details the license requirements of the Mobile Communication 3100 (MC 3100).

Navigation

- "MCC 3100 and MC 3100 Web UI licenses" (page 29)
- "MCG 3100 licenses" (page 29)

MCC 3100 and MC 3100 Web UI licenses

The clients and MC 3100 Web UI require the following licenses:

- On the Enterprise Call Server (ECS)
  - a SIP Access Port License (on the Signaling Server) for SIP infrastructure support
  - one Universal Extension (UEXT) for each client
- One client license key for each user

The MCG 3100 manages the client license keys using site licenses. For more information about MCG 3100 licensing, see "MCG 3100 licenses" (page 29).

A device which connects using the MCC 3100 or the MC 3100 Web UI only consumes one license. The user cannot be connected through the MCC 3100 and the MC 3100 Web UI at the same time. Logging in on one interface forces the other interface to terminate.

MCG 3100 licenses

The MCG 3100 requires a site license that contains the individual license keys for each client user. The MCG 3100 allocates the license keys, upon request, to the client.

On the ECS, the MCG 3100 uses one SIP Access Port license on the Signaling Server. Each client requires one UEXT.

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The MCG 3100 requires internet access to www199.nortel.com (using port 8008) to validate the client licenses on the clients.

During installation, the MCG 3100 stores the site license file. The site license contains the licenses for the clients. The MCG 3100 does not distribute the licenses to the clients.

When a user accesses the client application, the client software contacts the MCG 3100. The MCG 3100 allocates licenses on demand until the maximum number of licenses are allocated. The license returns to the pool when the user logs off the client.

The MCG 3100 administrator can revoke licenses from individual users to reclaim the licenses.

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Interworking requirements with CS 1000

This chapter details the interworking requirements for the Mobile Communication 3100 (MC 3100) and Nortel Communication Server 1000 (CS 1000), which is a supported Enterprise Call Server (ECS).

Navigation

- "CS 1000 deployment considerations" (page 31)
- "CS 1000 Source Based Routing" (page 32)
- "CS 1000 package requirements" (page 32)
- "CS 1000 engineering for MC 3100" (page 32)
- "CS 1000 capacity requirements" (page 39)
- "CS 1000 release and supported MC 3100 features" (page 44)
- "Call Detail Recording" (page 45)

CS 1000 deployment considerations

The Mobile Communication Gateway 3100 (MCG 3100) requires data access to the CS 1000 Telephony Local Area Network (TLAN). The MCG 3100 uses the CS 1000 Session Initiation Protocol (SIP) Proxy Server (SPS) as the SIP Signaling Proxy. The MCG 3100 accepts or transmits real time protocol (RTP) messages to any IP endpoint within the Enterprise (for example, Media cards, other SIP clients, or IP telephones).

To allow public internet traffic to reach the MCG 3100 from clients, while simultaneously providing MCG 3100 access to the CS 1000 TLAN for SIP and RTP, you must carefully consider the data network and security requirements of the Enterprise.

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CS 1000 Source Based Routing

CS 1000 Source Based Routing (SBR) occurs when the request Uniform Resource Indicator (URI) of the INVITE message sent from the Mobile Communication Client 3100 (MCC 3100) or the MCG 3100 contains the tag x-nt-net-feature=x-nt-home. For example, the following request URI triggers SBR:

INVITE sip:+16131234567@nortel.com;x-nt-sip-line-service;x-nt-net-feature=x-nt-home SIP/2.0

SBR causes the CS 1000 Network Routing Service-SIP Proxy Service (NRS-SPS) to route the call attempt (INVITE) to the P-Asserted-Id in the SIP INVITE instead of using the Request URI.

Using SBR means that all calls from a SIP user route to the home call server for origination, allowing the call server to apply features such as Calling Line ID (CLID) and Network Class of Service (NCOS) to SIP calls.

In the MCG 3100, use the User Prefix/Phone-context for Call origination field to configure SBR. For information, see *Nortel Mobile Communication 3100 Administration and Security* (NN42030-600).

CS 1000 package requirements

CS 1000 requires the following packages to support MC 3100:

- FMCL package (414)
- Mobile Extension (412)
- PCA (398)
- ISDN (145)

If the MC 3100 supports the CallPilot Message Waiting Indicator, the following package must be licensed:

- Premium Service and NMC (175, 219)

CS 1000 engineering for MC 3100

The MC 3100 Web User Interface, MCC 3100 for BlackBerry, MCC 3100 for Nokia, MCC 3100 for Windows Mobile, and MCG 3100 depend on the following CS 1000 components:

- Call server
  - — Each user requires one Universal Extension (UEXT). Each UEXT supports the SIP interface on the client. Configure the UEXT with the Fixed Mobile Convergence Line (FMCL) subtype.The FMCL subtype requires an Incremental Software Management (ISM) independent of the Mobile Extension (MOBX) subtype.

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  - — SIP Access Port license
- SIP Gateway, operating on the VxWorks Signaling Server platform
- SPS, using the NRS-SPS on the Linux-based NRS.
  - — Configure each MCG 3100 as a Dynamic Gateway Endpoint with an endpoint name. Configure the Dynamic Gateway Endpoint with authentication turned off.
  - — Each client requires the configuration of an NRS-SPS User Endpoint (UE). Clients use the UE for user name and password information, not for SIP routing. Therefore, the NRS-SPS must never match a destination number against the client UEs (including the corresponding UEXT Target DN).

The Direct Inward Dial (DID) number for the Dial in Service DN terminates on the MCG 3100.

Configure the CS 1000 with a mobility prefix to support the client. The UEXT target DN uses the mobility prefix as a prefix to identify mobile users. The mobility prefix is a unique digit sequence that does not conflict with the CS 1000 Universal Dialing Plan (UDP), Coordinated Dialing Plan (CDP), and routing configuration.

The Multiple Access Directory Number (MADN) is a DN that appears on multiple terminal numbers (TN). The Multiple Appearance Directory Number Redirection Prime (MARP) is a designation that is put on one of the TNs to identify that specific features apply to the DN that is on multiple TNs should be configured for the group on the TN that is the MARP. For more information, see *Features and Services Fundamentals* (NN43001-106).

The CS 1000 NRS-SPS supports the Source Based Routing (SBR) feature. SBR ensures that, for all users of an MCG 3100, the CLID NCOS and dial plan they see on their mobile phone is consistent with their desk phone. The SPS routes all MC 3100 call attempts to the user's home call server so that those features configured on the home call server can be applied to the MC 3100 call. For information about Source Based Routing (SBR), see "CS 1000 Source Based Routing" (page 32).

Figure 7 "Client with CS 1000 and UDP" (page 34) shows an example of clients using a CS 1000 UDP.

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Figure 7
Client with CS 1000 and UDP

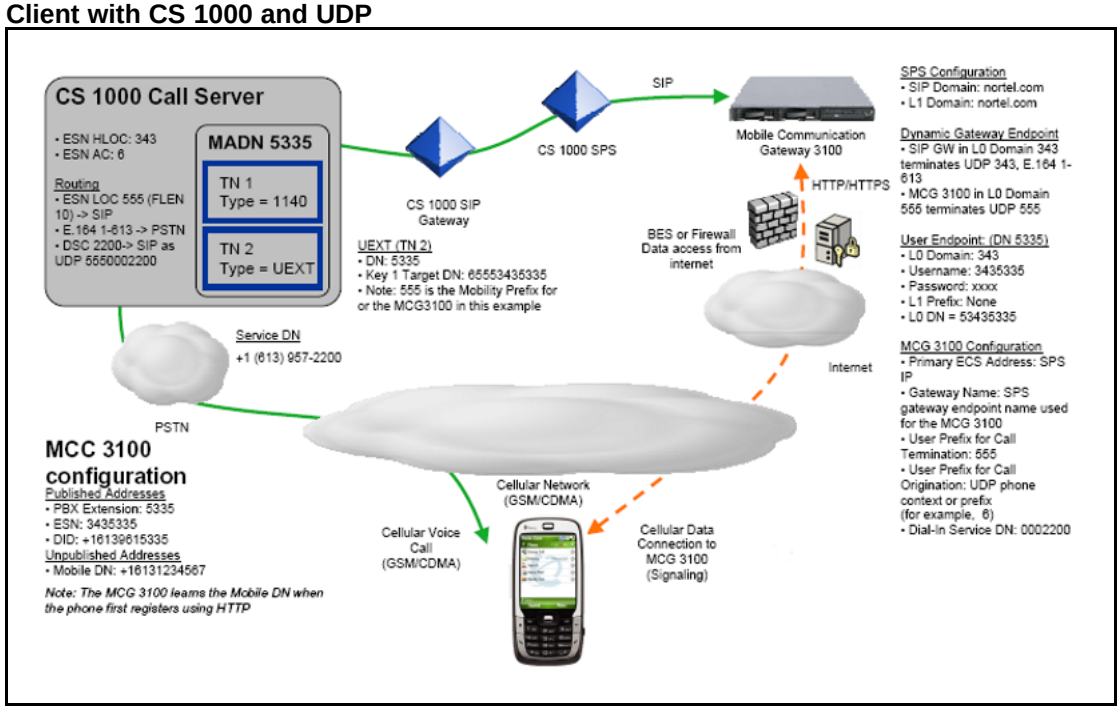
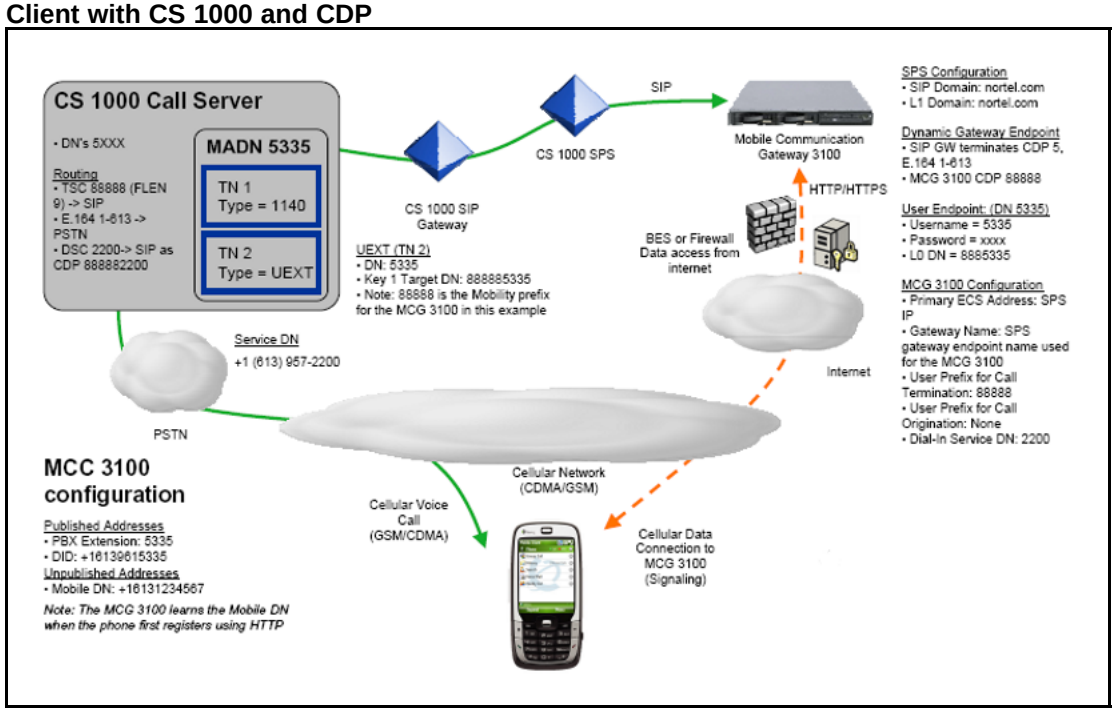


Figure 8 "Client with CS 1000 and CDP" (page 34) shows an example of clients using a CS 1000 CDP.

Figure 8
Client with CS 1000 and CDP



The UEXT configuration requirements are shown in the following table.

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Table 3
UEXT configuration parameters

Parameter	Description	UDP example	CDP example
Subtype	UEXT subtype; must be FMCL	FMCL	FMCL
primary DN	On key 0; this determines the user's published addresses for both private electronic switched network (ESN) and public direct inward dial (DID).	5335 contributes to an ESN of 3435335 and a DID of +16139615335	5335 contributes to a DN of 3435335 and a DID of +16139615335
target DN	Extends the user's incoming calls to mobile clients that are accessible trough the SIP domain	65553435335	888885335

On the NRS-SPS, configure the UE attributes as described in Table 4 "User Endpoint attributes" (page 35).

Table 4
User Endpoint attributes

Parameter	Description	Example
User name	User's Electronic Switched Network (ESN) number	3435335
Tandem gateway endpoint name	Endpoint name. Do not configure this parameter	
L0 DN	Based on the user's directory number (DN). Cannot match anything in the Coordinated Dialing Plan or unqualified dialing plan. Can be the last digit of the mobile prefix with the User's ESN DN.	53435335
L1 DN prefix	not required	
Authentication enabled	Determines if Authentication is required.	Authentication on
Authentication password	The password for authentication	xxxxxxxx

For more information about UEXTs, see *Features and Services Fundamentals – Book 6 of 6* (NN43001-106-B6). For information about SIP Gateway configuration, see *IP Peer Networking Installation and Commissioning* (NN43001-313).

SIP Trunk configuration

You must configure the communication server SIP trunk that receives MCG 3100 calls, on behalf of mobile client users, to ESN5. You must configure all associated Virtual trunks to WNK/WNK. The mobile client

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requires these settings so that calls to the Public Network display the correct Calling Line ID (CLID) and have the same Network Class of Service (NCOS) as a call from the associated communication server telephone.

The output for the WNK/WNK Virtual Trunk, from Element Manager or a terminal window, looks like this:

```
DES IPTIE
TN 081 0 00 02 VIRTUAL
TYPE IPTI
CDEN 8D
CUST 0
XTRK VTRK
ZONE 000
TRK ANLG
NCOS 0
RTMB 10 3
CHID 3
TGAR 0
STRI/STRO WNK WNK
SUPN YES
AST NO
IAPG 0 *
CLS UNR DIP WTA LPR APN THFD XREP
P10 NTC MID
TKID *
AACR NO
```

Attention: All of the SIP Virtual Trunks must be configured to WNK WNK.

The output for the ESN5 Route Data Block, from Element Manager or a terminal window, looks like this:

```
TYPE RDB
CUST 00
DMOD
ROUT 10
DES IPROUTE
TKTP TIE

...
VTRK YES
```


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ZONE 100
PCID SIP

...
ANTK
SIGO ESN5
STYP SDAT

Attention: If the Route Data Block (RDB) already has associated Virtual Trunks and is configured to SIGO STD, you must remove all Virtual Trunks before you can change the RDB to ESN5.

Device Handoff configuration

Device handoff permits the MC 3100 user to hand off an established call between the mobile phone and the desk telephone. The desk telephone must be configured with a handoff key. Device handoff can be used only when the desk telephone and the Universal Extension (UEXT) share the same primary DN in a Single Call Ringing (SCR) configuration. Device handoff is not supported when the desk telephone and MCC 3100 user are in a Multiple Call Ringing (MCR) arrangement. In this situation, the user must transfer the call between the appearances.

Device handoff requires the configuration of the handoff key on the desktop telephone. Device handoff is supported on any CS 1000 telephone that supports the configuration of fixed feature keys. These telephones include the Nortel IP Phones (with Unified Network IP Stimulus Protocol [UNIStim] firmware), the IP Softphone 2050, and Time Division Multiplex (TDM) telephones.

On the mobile phone, there is no privacy protection if the UEXT does not have Station Control Password (SCPW) configured. For desk telephones (even with SCPW), there is no privacy protection if the desk telephone has Privacy Override Allowed (CLS POA) or if the desk telephone is an analog telephone (500- or 2500-type telephone).

For SCPW privacy protection on the mobile phone, the system administrator must configure the SCPQ length under LD 15 CDB FFC_DATA SCPL, and the SPQ on the UEXT under LD 11 SCPW prompt.

In addition, the following configuration requirements must be met:

- FMCL and Mobile X (MOBX) cannot coexist with same DN.
- the DN can only have one of the following UEXT types: SIP3, SIPN, FMCL.

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For more information, see *Nortel Mobile Communication 3100 and Communication Server 1000 Solution Integration Guide* (NN49000-315) and *Features and Services Fundamentals* (NN43001-106).

CS 1000 feature interactions

The clients support a high availability configuration for improved redundancy and failover. Configure the client with primary and secondary proxy addresses that refer to different NRS-SPSs. The clients use an options heartbeat to determine proxy availability. You can configure the heartbeat time.

The clients also support existing SIP redundancy mechanisms in both communication servers within a SIP deployment.

Call Forward No Answer feature interactions

It can be necessary to increase the Call Forward No Answer (CFNA) timeout for mobile client users. The UEXT extends all calls to the MCG 3100. The MCG 3100 then presents the incoming call to the MCC 3100 client over the cellular data channel of the MCC 3100 (using HTTP/HTTPS).

It can take a few seconds for the data transmission to reach the client, depending on the current state of the mobile pone. If the CFNA timeout is too short, users do not have reasonable time to (potentially) log on and answer the call before the call server invokes CFNA and sends the call to the CFNA destination.

To increase the CFNA timeout, configure the CS 1000 using LD 15 and LD 11.

LD 15 configures the CFN0, CFN1, and CFN2 indexes:

```
LD 15
REQ: chg
TYPE: rdr
TYPE RDR_DATA
CUST 0
OPT
FNAD
FNAT
FNAL
CFTA
CCFWDN
CFN0
CFN1 6
CFN2
DFN0
DFN1
```


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```
DFN2
MDID
NDID
MWFB
TRCL
CRTOD
CRDAY
CRHOL
```

LD 11 configures the number of ringing cycles for CFNA. Configure the CFN index that corresponds to the RCO entry configured in LD 15 (for example, RCO 1 uses CFN 1).

```
LD 11
REQ: chg
TYPE: 1140
TN 100 0 8 23
ECHG yes
ITEM rco 1
ITEM
HNT FNA
HNT FNA
```

CS 1000 capacity requirements

An MC 3100 implementation requires the CS 1000 system to include the appropriate number of Public Service Telephone Network (PSTN) connections (for example, Primary Rate Interface [PRI] or digital trunk interface [DTI] trunks), SIP Access Ports, and UEXTs.

MC 3100 licenses include one SIP Access Port per client license.

For deployments with unusual trunking requirements, the number of SIP Access Ports and PSTN trunks must be calculated as described below.

The number of configured users and the required Centi-Call Seconds (CCS) per User determine the required number of PSTN connections and trunks. The CCS per User represents the amount of time a circuit is occupied by each user in 100 seconds (for example, 6 CCS per user means each user is busy 600 seconds during an hour). Choose the CCS per User value based on the typical call load requirements. A value of 6 CCS per User represents normal users; heavier users have progressively higher values. For example, call center telephones normally have CCS per User values of 33.

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You can use one of the two following methods to calculate the PSTN trunks and SIP Access Ports:

- "Trunk calculation: Method 1" (page 40)
- "Trunk calculation: Method 2" (page 41)

To calculate the number of UEXTs required, see "UEXT calculations" (page 44).

For more information about CS 1000 capacity, see *Communication Server 1000E Planning and Engineering* (NN43041-220).

Trunk calculation: Method 1

Follow these steps:

1. Add the number of client users.
2. Locate the resulting number in the Number of Users column in Table 5 "Poisson trunk table" (page 40).
3. Select the appropriate PSTN and SIP Access Port parameters based on the required CCS per Users.

Table 5 "Poisson trunk table" (page 40) uses a Poisson value of P.01, which represents 1 percent blocking.

Table 5
Poisson trunk table

Number of users	Parameter	Up to 6 CCS per User	Up to 12 CCS per User	Up to 18 CCS per User	Up to 24 CCS per User
6	PSTN	5	6	6	6
	SIP Access Port	10	12	12	12
12	PSTN	7	10	12	12
	SIP Access Port	14	20	24	24
18	PSTN	9	13	18	18
	SIP Access Port	18	26	36	36
24	PSTN	10	16	22	24
	SIP Access Port	20	32	44	48
50	PSTN	17	28	38	48
	SIP Access Port	34	56	76	96
75	PSTN	22	38	53	68
	SIP Access Port	44	76	106	136
100	PSTN	28	48	68	87
	SIP Access Port	56	96	136	174

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Table 5
Poisson trunk table (cont'd.)

Number of users	Parameter	Up to 6 CCS per User	Up to 12 CCS per User	Up to 18 CCS per User	Up to 24 CCS per User
150	PSTN	38	68	97	125
	SIP Access Port	76	136	194	250
200	PSTN	48	87	125	162
	SIP Access Port	96	174	250	324
300	PSTN	68	125	180	238
	SIP Access Port	136	250	360	476
400	PSTN	82	162	238	317
	SIP Access Port	164	324	476	634
500	PSTN	106	198	297	396
	SIP Access Port	212	396	594	792
600	PSTN	125	238	356	475
	SIP Access Port	250	476	712	950
700	PSTN	144	277	416	554
	SIP Access Port	288	554	832	1108
800	PSTN	162	317	475	633
	SIP Access Port	324	634	950	1266
900	PSTN	180	356	534	712
	SIP Access Port	360	712	1068	1424
1000	PSTN	198	396	594	792
	SIP Access Port	396	792	1188	1584

Example

In a system with 100 users and 6 CCS per User, use Table 5 "Poisson trunk table" (page 40) to locate 100 in the Number of Users column. Use the Up to 6 CCS per User column to find the following parameters:

- PSTN = 28
- SIP Access Port = 56

Trunk calculation: Method 2

Follow these steps:

1. To determine the number of PSTN trunks required, add the number of clients to obtain the total number of users.

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2. Multiply the total number of users by the desired CCS per User number to obtain a CCS value.
3. Use Table 6 "Trunk traffic Poisson 1 percent blocking" (page 42) to find the CCS value and obtain the number of PSTN trunks (in the cell to the left of the CCS number). If the CCS value is between two values in the trunks column, choose the higher number of trunks. For trunk traffic greater than 6068 CCS, allow 30.34 CCS per trunk.
4. Multiply the number of PSTN trunks by two to obtain the number of SIP Access Ports required.

Table 6
Trunk traffic Poisson 1 percent blocking

Trunks	CCS	Trunks	CCS	Trunks	CCS	Trunks	CCS
1	0.4	51	1291	101	2847	151	4460
2	5.4	52	1322	102	2879	152	4492
3	15.7	53	1352	103	2910	153	4525
4	29.6	54	1382	104	2942	154	4557
5	46.1	55	1412	105	2974	155	4590
6	64	56	1443	106	3006	156	4622
7	84	57	1473	107	3038	157	4655
8	105	58	1504	108	3070	158	4686
9	126	59	1534	109	3102	159	4721
10	149	60	1565	110	3135	160	4754
11	172	61	1595	111	3166	161	4786
12	195	62	1626	112	3198	162	4819
13	220	63	1657	113	3230	163	4851
14	244	64	1687	114	3262	164	4884
15	269	65	1718	115	3294	165	4917
16	294	66	1749	116	3326	166	4549
17	320	67	1780	117	3359	167	4982
18	346	68	1811	118	3391	168	5015
19	373	69	1842	119	3424	169	5048
20	399	70	1873	120	3456	170	5081
21	426	71	1904	121	3488	171	5114
22	453	72	1935	122	3520	172	5146
23	480	73	1966	123	3552	173	5179
24	507	74	1997	124	3594	174	5212
25	535	75	2028	125	3616	175	5245

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Table 6
Trunk traffic Poisson 1 percent blocking (cont'd.)

Trunks	CCS	Trunks	CCS	Trunks	CCS	Trunks	CCS
26	562	76	2059	126	3648	176	5277
27	590	77	2091	127	3681	177	5310
28	618	78	2122	128	3713	178	5343
29	647	79	2153	129	3746	179	5376
30	675	80	2184	130	3778	180	5409
31	703	81	2215	131	3810	181	5442
32	732	82	2247	132	3843	182	5475
33	760	83	2278	133	3875	183	5508
34	789	84	2310	134	3907	184	5541
35	818	85	2341	135	3939	185	5574
36	847	86	2373	136	3972	186	5606
37	876	87	2404	137	4004	187	5639
38	905	88	2436	138	4037	188	5672
39	935	89	2467	139	4070	189	5705
40	964	90	2499	140	4102	19	5738
41	993	91	2530	141	4134	191	5771
42	1023	92	2563	142	4167	192	5804
43	1052	93	2594	143	4199	193	5837
44	1082	94	2625	144	4231	194	5871
45	1112	95	2657	145	4264	195	5904
46	1142	96	2689	146	4297	196	5937
47	1171	97	2721	147	4329	197	5969
48	1201	98	2752	148	4362	198	6002
49	1231	99	2784	149	4395	199	6035
50	1261	100	2816	150	4427	200	6068

Example

In a system with 100 users and 6 CCS per User, the number of CCS required is 600 (100 users multiplied by 6 CCS per User). Locate 600 CCS in Table 6 "Trunk traffic Poisson 1 percent blocking" (page 42).

The entry in the table shows the number of PSTN trunks is between 27 and 28 (between 590 and 618 CCS). Therefore, choose 28 as the number of PSTN trunks.

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The number of SIP Access Ports is the number of PSTN trunks multiplied by 2, which is 28 x 2 = 56.

UEXT calculations

You require one UEXT for each MCC 3100 user.

CS 1000 release and supported MC 3100 features

The following table describes the MC 3100 call features (provided by the CS 1000).

Table 7
MC 3100 call features

	CS 1000 Mobile Extension	MC 3100 Web UI	MC 3100 Client
Single Enterprise Number Identity (CDP, UDP, DID)	√	√	√
Enterprise CLID for Outbound Calls from Mobile	√	√	√
Access to Enterprise Dial Plan from Cellular Network	√	√	√
Enterprise Calling Restrictions (NCOS)	√	√	√
Call Forward Support on Call Server (CFB, CFIC, hunting)	√	√	√
Ring Again (against mobile)	√	√	√
Busy Lamp Indication on Attendant Console	√	√	√
Call Detail Recording (CDR)	√	√	√
Busy State (Active Call on Mobile appears on other line appearances and OCS presence as "on the phone" for mobile calls)	√	√	√
Device Handoff—Move active call from mobile to desk phone - Move active call from desk phone to mobile	√	√	√
Single Enterprise Voicemail Mailbox	√	√	√
Enterprise Voicemail Enforcement	√	√	√
Music On Hold	√	√	√
Support for any phone (mobile, home phone, other)	√	√	Requires installed client
Mid Call Features—Hold, Retrieve, Consultation Call, Transfer, Conference	Using DTMF	Using DTMF	√
Client User Interface For Mobile Features	X	√	√

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Table 7
MC 3100 call features (cont'd.)

	CS 1000 Mobile Extension	MC 3100 Web UI	MC 3100 Client
Enterprise Voicemail MWI	Using third-party applica-tion	√	√
Advanced Call Control—Direct Outbound calls from mobile via the enterprise voice network	Carrier support required	X	√
Native Call Intercept—Send calls made from any application on the mobile via the enterprise voice network	NA	X	√
Advanced Call Control—Call Me First calls via the enterprise voice network	X	√	√
Advanced Call Control—Dynamically redirect incoming calls to any phone number	X	X	√
Advanced Call Control—User configurable time of day call routing for inbound calls	X	√	X
Support for Multiple SIM cards	X	√	√
Corporate Directory Search	X	√	√
Presence/IM Support	X	X	√
Enterprise Call Logs	X	X	√
Instant Conferencing (Invite a list of participants defined using a user interface on the client)	X	X	√
Access to Local Directory on Mobile	NA	X	√
Configurable Emergency Number Support via Cellular network	NA	X	√
Customizable voice prompts	NA	NA	√
Integrated with CS 1000—No additional hardware required	√	COTS platform required	COTS platform required

Call Detail Recording

The mobile clients support Call Detail Recording (CDR) for all calls initiated or accepted by the mobile clients.

Interpret the CDR records according to the type of call made or received by the mobile clients.

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Direct outbound call

When a user makes an outgoing call, the mobile client user's home CS 1000 generates two CDR records.

- The first CDR record provides details of the call from the mobile phone to the service DN. In this record, the originator is the mobile phone number and destination is the service DN.
- The second CDR record provides details of the outgoing call to the called party. In this record, the originator is the username of the mobile client user and the destination is the destination number dialed by the user.

Call-Me-First outbound call

When the user makes a Call-Me-First outbound call, the mobile client user's home CS 1000 generates two CDR records.

- The first CDR record provides details of the call from the MCG 3100 to the mobile phone. In this record, the originator is the username of the mobile client and the destination number is the mobile phone number.
- The second CDR record provides details of the outgoing call from the MCG 3100 to the called party. In this record, the originator is the username of the mobile client user and the destination is the destination number dialed by the user.

Incoming call

For incoming calls, the Universal Extension (UEXT) on the home CS 1000 extends incoming calls to the MCG 3100 (and eventually to the mobile client). For each incoming call, the UEXT merges two calls: the incoming call to the DN on the CS 1000 , and then the outgoing extended call to the mobile phone. Incoming calls to the mobile client that the user answers on the mobile phone generate four CDR records on the home CS 1000 .

- The first CDR record provides details of the incoming call to the Multiple Appearance DN (MADN). In this record, the originator is the caller and destination is the multiple appearance DN where the UEXT is configured.
- The second CDR record provides the details of the UEXT extended call to the MCG 3100 (the target DN of the UEXT). In this record, the originator is the MADN number of the UEXT, and the destination is the UEXT target DN that is extending the call to the MCG 3100.
- The third CDR record (generated after the UEXT merges the calls) provides details of the originating and terminating parties in the call.
- The fourth CDR record (generated after the user elects to answer the call on their mobile phone) provides the details of the outgoing call from the MCG 3100 to the mobile phone. In this record, the originator is the

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username of the mobile client, and the destination is the mobile number of the mobile client user.

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