Avaya Call Management System

Switch Connections, Administration, and Troubleshooting

November 2009

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Contents

Preface

Avaya Call Management System (CMS) is an application for businesses and organizations that use Avaya communication servers to process large volumes of telephone calls using the Automatic Call Distribution (ACD) feature. Avaya CMS supports solutions for routing and agent selection, multi-site contact centers, remote agents, reporting, interfaces to other systems, workforce management, desktop applications, system recovery, and quality monitoring.

Avaya CMS is part of the Operational Effectiveness solution of the Avaya Customer Interaction Suite.

This section includes the following topics:

Purpose

This document describes how to connect and administer Avaya communication servers (switches) that are used with the Avaya CMS.

Intended users

This document is written for:

- Avaya support personnel
- Contact center administrators

This document assumes a minimum level of technical knowledge on the part of its readers. It assumes, for example, that a reader knows how to use the switch administration interfaces and how to connect switch hardware.

Overview

- Switch and CMS release compatibility on page 11 - Provides an overview of the supported CMS software, supported hardware platforms, required software, and supported software releases.
- Connecting a TCP/IP switch link on page 13 - Explains how to connect the switch to the CMS computer over a LAN using TCP/IP.
- Administering a TCP/IP switch link on page 41 - Explains how to administer the switch for the connections to a CMS computer over a LAN using TCP/IP.
- Troubleshooting TCP/IP switch connections on page 73- Explains how to maintain and troubleshoot the hardware and software components that make up a switch link over a LAN using TCP/IP.
- Glossary on page 77

Conventions and terminology

The following terminology is used in this document:

- Unless specified otherwise, all information and procedures in this document apply to the Sun computers that support the CMS product. In this document, they are referred to as the "CMS computer."
- Unless otherwise specified, all switch connectivity and administration applies to all models of Avaya switch software and hardware, including the following:
  - Avaya DEFINITY Server Avaya Professional Services, SI, and R

Note:
Support for the DEFINITY Server R ended beginning with Communication Manager 2.0. Support for the DEFINITY Server SI ended beginning with Communication Manager 3.0.

  - DEFINITY One
  - Avaya IP600
  - Avaya S8300-series, S8500-series, S8700-series, and S8800-series Servers
  - Avaya G-series media gateways (for example, G450, G430, G700, G650, G350, and so on) that are certified for call center configurations
  - SBS3000 Hosted Bladeserver Chassis and related equipment

- Automatic Call Distribution (ACD) is a feature of the switch software. The ACD feature is used to route incoming calls to groups of agents. When this document refers to "connecting to an ACD," it refers to connecting to a switch that has ACD capabilities.

If you see any of the following safety labels in this document, take careful note of the information presented.

CAUTION:
Caution statements call attention to situations that can result in harm to software, loss of data, or an interruption in service.

WARNING:
Warning statements call attention to situations that can result in harm to hardware or equipment.

DANGER:
Danger statements call attention to situations that can result in harm to personnel.

SECURITY ALERT:
Security alert statements call attention to situations that can increase the potential for unauthorized use of a telecommunications system.

Reasons for reissue

This document was reissued for the following reasons:

- To add updates for R16
- To add information about the S8800 server
- To add information about support of the duplicated processor ethernet connection
- To make general wording corrections to the document.
- Added information about new models of switch servers and gateways.

Documentation Web sites

All CMS documentation can be found at http://www.avaya.com/support. New issues of CMS documentation will be placed on this Web site when available.

Use the following Web sites to view related support documentation:

- Information about Avaya products and service

  http://www.avaya.com
- Sun hardware documentation

  http://docs.sun.com

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Switch and CMS release compatibility

Different releases of CMS software are certified to interface with the following switch software releases.

Communication server software release	CMS software release						
	R3V9	R3V11[1]	R12	R13.x	R14.x	R15	R16
DEFINITY R9.1, R9.2	Yes[2]	Yes	Yes	Yes	Yes	No	No
Avaya Call Processing R9.5	Yes[2]	Yes	Yes	Yes	Yes	No	No
Avaya Call Processing R10	Yes[2]	Yes	Yes	Yes	Yes	No	No
Communication Manager 1.1, 1.2, 1.3[3]	Yes	Yes[2]	Yes	Yes	Yes	No	No
Communication Manager 2.0, 2.1, 2.2	Yes	Yes	Yes[2]	Yes	Yes	Yes	Yes
Communication Manager 3.0, 3.1	Yes	Yes	Yes	Yes[2]	Yes	Yes	Yes
Communication Manager 4.0	No	Yes	Yes	Yes	Yes[2]	Yes	Yes
Communication Manager 5.0,5.1	No	No	Yes	Yes	Yes[2]	Yes	Yes
Communication Manager 5.2	No	No	Yes	Yes	Yes	Yes[2]	Yes
Communication Manager 5.2.1	No	No	Yes	Yes	Yes	Yes	Yes[2]

1. Systems that are upgraded to this software release can use existing X.25 links. New systems must use TCP/IP ethernet links.
2. Recommended release combination.
3. Systems that are upgraded to this software release can use existing X.25 links. New systems must use TCP/IP ethernet links.

Connecting a TCP/IP switch link

This section explains how to connect the CMS computer to the switch using TCP/IP over a local area network (LAN).

This section includes the following topics:

Overview

The connection between the CMS computer and a switch allows the CMS software on the computer to receive, store, and format the Automatic Call Distribution (ACD) information it receives from one or more switches.

A switch technician should be on-site to make the connection from the CMS computer to the switch and, if necessary, to administer the switch for the ACD feature and CMS. The CMS software will not communicate with the switch if the ACD feature, CMS, or the switch hardware is not properly administered. See Administering a TCP/IP switch link on page 41 for more information.

This section includes the following topics:

Local vs remote connections

This section shows both local and remote connections between the switch and the CMS computer. For clarification, these connections are defined as follows:

- Local - The connections between the switch and the CMS computer use facilities local to the switch, such as a direct connection over a LAN.
- Remote - The connections between the switch and the CMS computer use wide area network (WAN).

Multiple ACDs (switches)

One CMS computer can collect data from up to eight different switches. From the CMS computer point of view, each switch represents one ACD. Each switch requires a link to the CMS computer.

High availability option

The High Availability option provides dual links between the switch and two separate CMS computers. If the customer has purchased the High Availability option, you must connect a link from one ethernet port on the switch to one CMS computer, and a second link from a different ethernet port on the switch to another CMS computer. The High Availability option is not allowed using X.25 links.

Note:
For the S8300 Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.

In addition to having the correct CMS R3V8 or later load, the switch must be optioned with software version of V8 or later, Call Center Release of 8.1 or later, and Adjunct CMS Release of R3V8 or later. See Administering the CMS and switch release options on page 46 for more information.

Connecting blocks

In this section, references are made to 103A connecting blocks, which have one RJ45 connector per block. If needed, you can substitute the 104A connecting block, which has two RJ45 connectors per block. The wiring for both connecting blocks are identical.

Planning for TCP/IP switch links

When setting up a switch link using TCP/IP over a LAN, planning information must be gathered before you begin. In particular, you must take into account if the LAN connection includes both a connection to CMS, Intuity AUDIX with integrated messaging, and Avaya Operational Analyst (OA). Some of the information needed includes:

- How is the connection being made from the CMS computer to the switch?
  - Private LAN, no connectivity to customer LAN (uses private LAN addresses).
    - Preferred method, most robust and reliable, no dependency on customer's network
    - A dedicated LAN port on the CMS computer provides the switch link
    - The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link
    - If desired, a second ethernet port can be used to provide additional isolation for the CMS link
    - A dedicated LAN hub to connect the links.
  - Customer LAN with private segment.
    - Uses a network switch or router to provide a private network or network segment
    - Minimal dependency on customer's network
    - A dedicated LAN port on the CMS computer provides the switch link
    - The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link
    - Customer must provide equipment and administer network for private segment
    - Customer LAN administrator must be present during setup.
  - Direct connect to Customer LAN, without private segment.
    - Least preferred method
    - Complete dependency on performance and reliability of customer's LAN
    - Allows remote location of endpoints when customer LAN connectivity is convenient
    - Customer LAN administrator must be present during setup.

- If the customer LAN is used, the following information is needed from the customer:
  - Customer network physical connectivity:
    - Location of network access point (hub, router, and so on)
    - Distance between the ethernet port on the switch and the network access point (328 ft, 100 m maximum)
    - Wiring to access point, existing or new, Category 5 minimum required.
  - Customer network administration:
    - IP address of switch ethernet ports, CMS computer, Intuity, and gateways
    - Node names of switch ethernet ports, CMS computer, Intuity, and gateways
    - Subnet masks for all LAN segments containing switch ethernet ports or adjuncts
    - Gateway IP address for all LAN segments containing switch ethernet ports, adjuncts, or routers
    - Are all endpoints (switch ethernet ports and adjuncts) on the same local LAN segment?
    - Network routes.

    Network administration information needs to be mapped into specific administration fields.
- Sanity check of information obtained from customer:
  - If switch and adjuncts are on different LAN subnets (recommended), gateway IP addresses are different
  - If switch and adjuncts (CMS or Intuity) are on the same LAN subnet (not recommended):
    - Gateway IP address (if present) and subnet mask information is valid
    - All IP addresses contain the same subnet address

Without the above information, the technician may not be able to complete the installation. Installations that require the technicians to return because information was not available incur additional charges.

Switch connections with TCP/IP over a LAN

Any switch with R7 or later software equipped with either the TN799 C-LAN circuit pack or a processor ethernet port can interface to an R3V6 or later CMS computer using a LAN. This connection can be made in the following ways:

- Connecting with a crossover cable
- Connecting with a LAN hub or a network switch (recommended configuration)
- Connecting over a customer LAN

This section includes the following topics:

Connecting one or more ACDs using TCP/IP over a LAN

Any switch equipped with a TN799 C-LAN circuit pack or a processor ethernet port can interface to a CMS computer using a LAN. In most new installations since CMS R3V8, CMS computers have been equipped with at least two ethernet ports for network connections. The connection to the switch must be dedicated to a second ethernet port which is provided on a PCI or SBus card in the CMS server. The primary, built-in ethernet port can be used for Network Terminal Servers (NTS), printers, CMS Supervisor, and connections to Avaya OA. Avaya recommends that these two network connections be on different subnets.

Important:
If a CMS computer has a Token Ring card installed, this port cannot be used for the switch link.

Detailed parts lists and cabling diagrams are shown later in this document for each switch that supports a LAN connection.

Ethernet ports on the switch

The switch provides an ethernet port using either the TN799 C-LAN circuit pack or the processor ethernet port. For connectivity purposes, it does not matter what ethernet port is used, but the correct port must be administered on the switch.

The TN799 C-LAN supports CMS links on the following platforms:

- DEFINITY Server Avaya Professional Services using the CMC1 Media Gateway
- DEFINITY Server SI and R using the SCC1 and MCC1 Media Gateway

  Note:
  Support for the DEFINITY Server R ended beginning with Communication Manager 2.0. Support for the DEFINITY Server SI ended beginning with Communication Manager 3.0.
- Avaya IP600
- DEFINITY One
- Avaya S8100 Server using the G600, G650, or CMC1 Media Gateway
- Avaya S8700-series Server using the SCC1, MCC1, or G700 Media Gateway

The processor ethernet port supports CMS links on the following platforms that do not support C-LAN circuit packs:

- Avaya IP600 using the TN2314
- DEFINITY One using the TN2314
- Avaya S8100 Server
- Avaya S8300-series and S8500-series Servers
- Avaya S8700-series Servers using the IP Connect option
- Avaya SBS3000 Hosted Bladeserver Chassis
- Avaya S8800-series Servers

Ethernet ports on a CMS computer

In most new installations since CMS R3V8, CMS computers have been equipped with at least two ethernet ports for network connections. The connection to the switch must be dedicated to a second ethernet port which is provided on a PCI or SBus card in the CMS server. The primary, built-in ethernet port can be used for NTS, printers, CMS Supervisor, and connections to Avaya OA. Avaya recommends that these two network connections be on different subnets.

Important:
It is recommended that, if possible, the switch connection be isolated to a dedicated LAN port without any other network connections.

LAN speeds - 10 Mbps vs 100 Mbps

All TN799 C-LAN circuit packs support 10 Mbps ethernet connections. The TN799DP and later supports 10 and 100 Mbps ethernet connections as long as all the connecting equipment supports that speed. If you use 10 Mbps hubs between the switch and the CMS, the speed of the connection will be 10 Mbps.

The TN799DP C-LAN circuit pack also uses the IP Media Processor adapter (Material ID 848525887) to provide an ethernet modular jack connection on the switch backplane. This adapter must be used to attain 100 Mbps connections.

The processor ethernet port on the Avaya IP600, DEFINITY One, and S8xxx servers support 10 Mbps and 100 Mbps, autosensing.

C-LAN lead designations for cross-connects

The TN799 C-LAN circuit pack ethernet lead designations are as follows:

Lead Name	25-Pair Cable Wire Color	25-Pair Cable Connector Pin-out	RJ45 Jack Pin-out	Terminal Block Pin-out on Connecting Block
TD+	white/orange	27	1	3
TD-	orange/white	2	2	4
RD+	white/green	28	3	5
RD-	green/white	3	6	6

Use this information when making connections from the TN799 when using an IP Media Processor adapter (100 Mbps), a 259A adapter (10 Mbps), or using standard cross-connect wiring (100 Mbps or 10 Mbps).

Sample configurations

The CMS computer can connect to a switch in a number of ways using a LAN. This section shows some examples of how this can be done. Though several sample configurations are shown, there will be variations not shown here. All but the most basic configurations require planning by the customer and account team.

Note:
Please note that the IP addressing shown in these examples reflects a basic recommended scheme that can be used if the customer does not have their own addressing requirements.

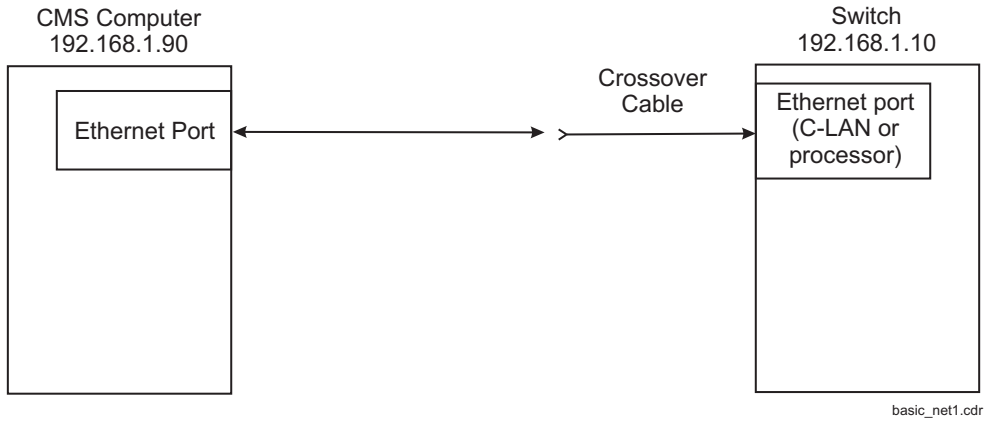
This section includes the following topics:

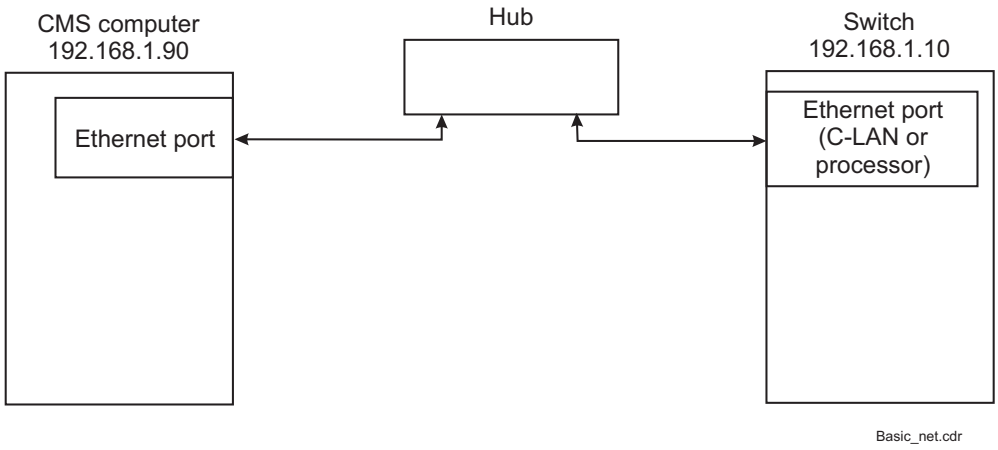
Note:
In certain permissive-use cases beginning with CMS R12, customers can continue to use an NTS for serial connectivity. Contact Avaya support for information about Avaya's permissive use policy and using an NTS with CMS. These sample configurations show NTS connectivity to support releases that allow NTS usage.

Basic configuration

In the most basic configuration, you can create a LAN between a CMS computer to a switch using either a crossover cable or a dedicated hub. This setup provides isolation from the customer data network, keeping all switch-to-CMS messaging traffic on a dedicated private network. The CMS computer is directly connected to the switch, and neither is part of another network.

This configuration is adequate if there is no NTS, printer, CMS Supervisor traffic, or Intuity Message Manager traffic.



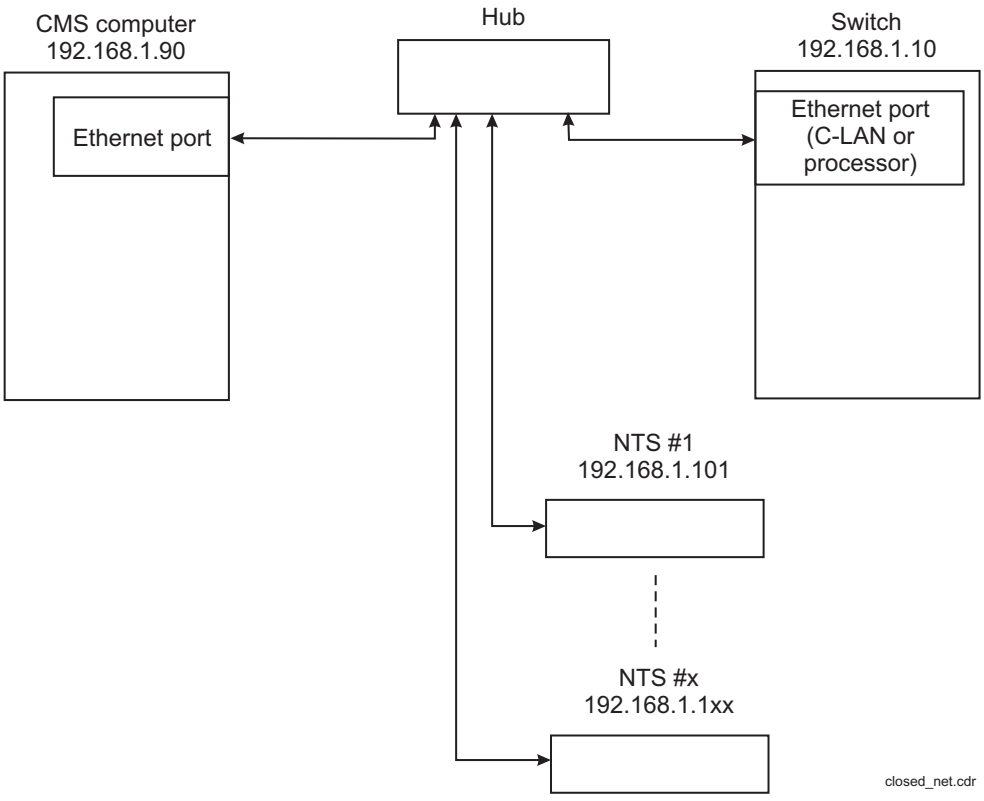


Basic configuration with NTS

Building on the previous example, the following diagram shows how you can add a LAN hub to provide additional LAN points of connection for NTS equipment. Using the same LAN segment for NTS and switch traffic is not recommended, but can be done if the CMS computer has only one ethernet port.

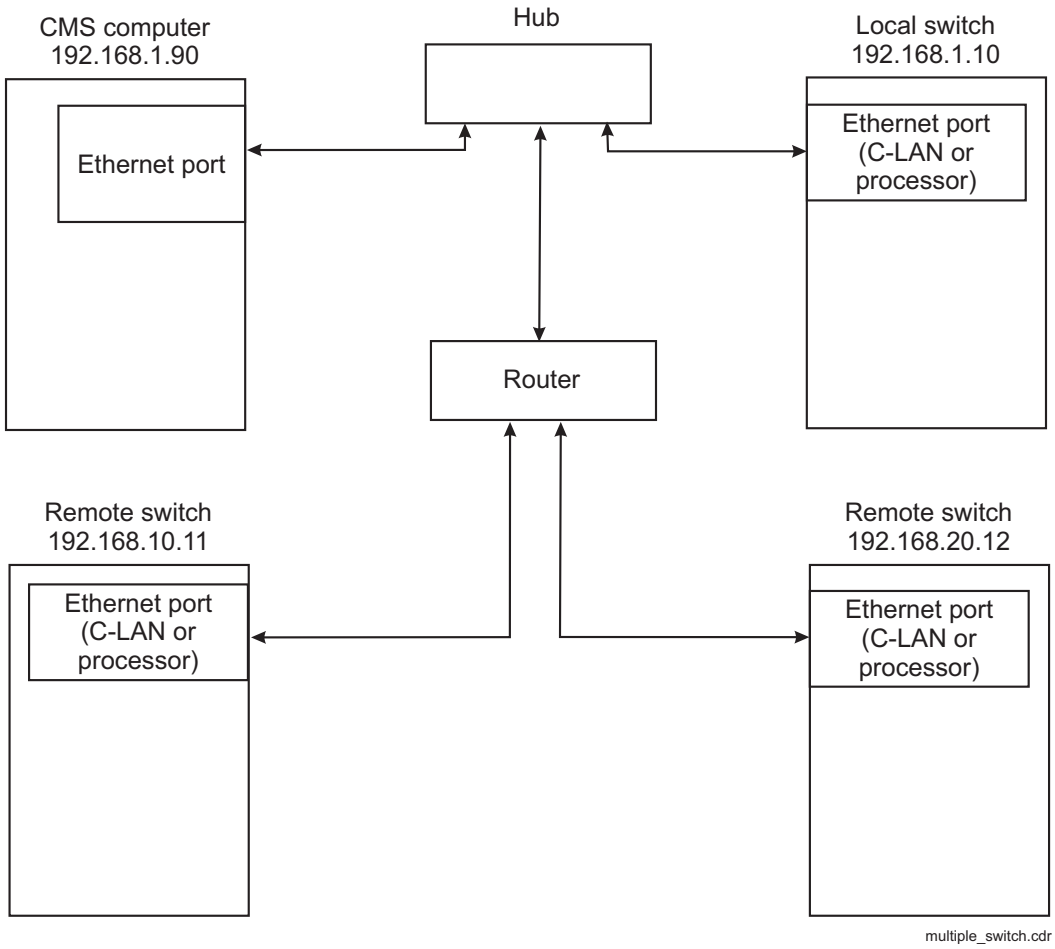
Note:

In certain permissive-use cases beginning with CMS R12, customers can continue to use an NTS for serial connectivity. Contact Avaya support for information about Avaya's permissive use policy and using an NTS with CMS.



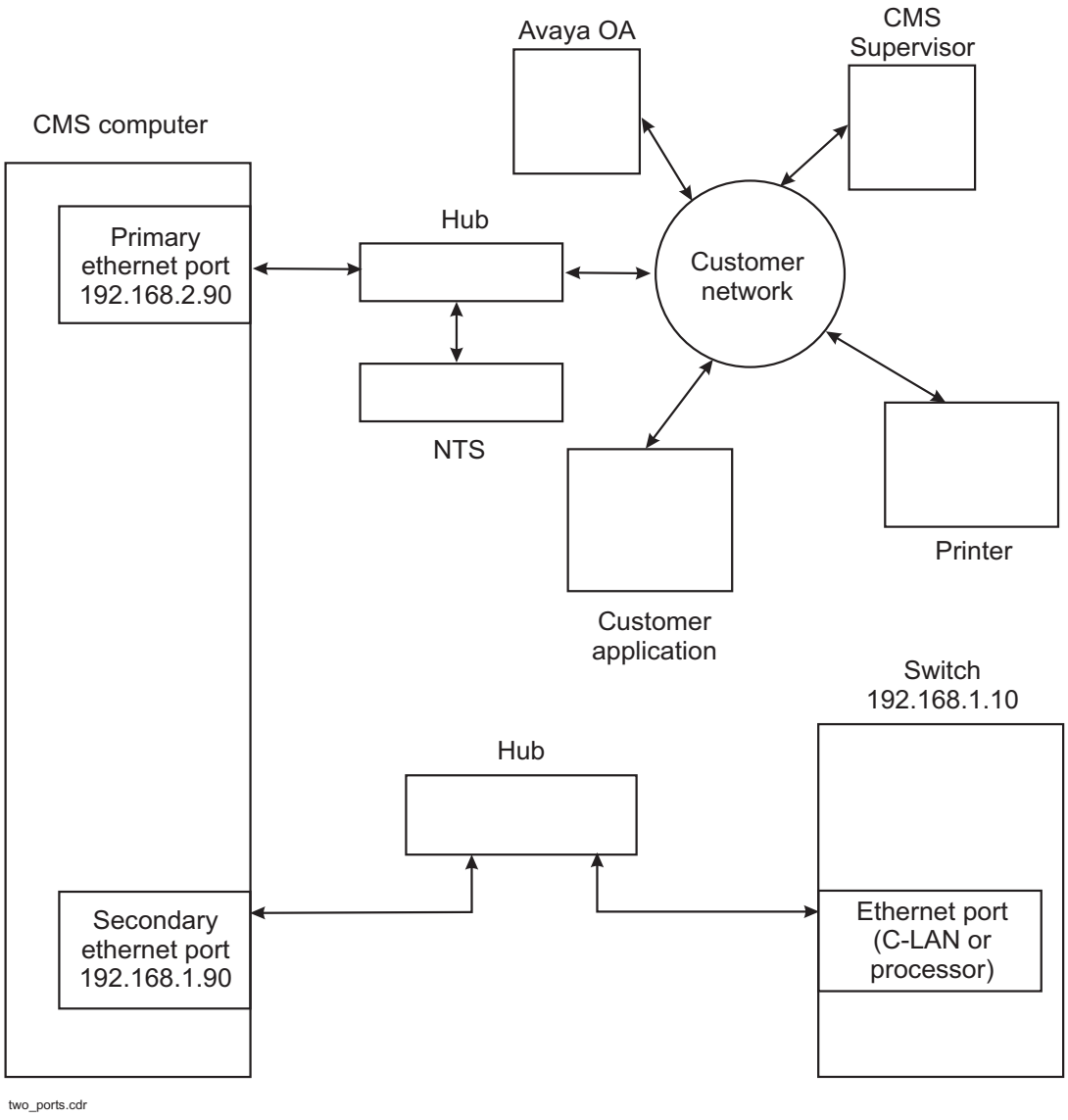
Multiple ACDs (switches)

A CMS computer can collect data from more than one switch. The following figure shows how several ACDs (local or remote) would connect to a CMS computer over a LAN. This example isolates the switch-to-CMS traffic from any other network traffic.



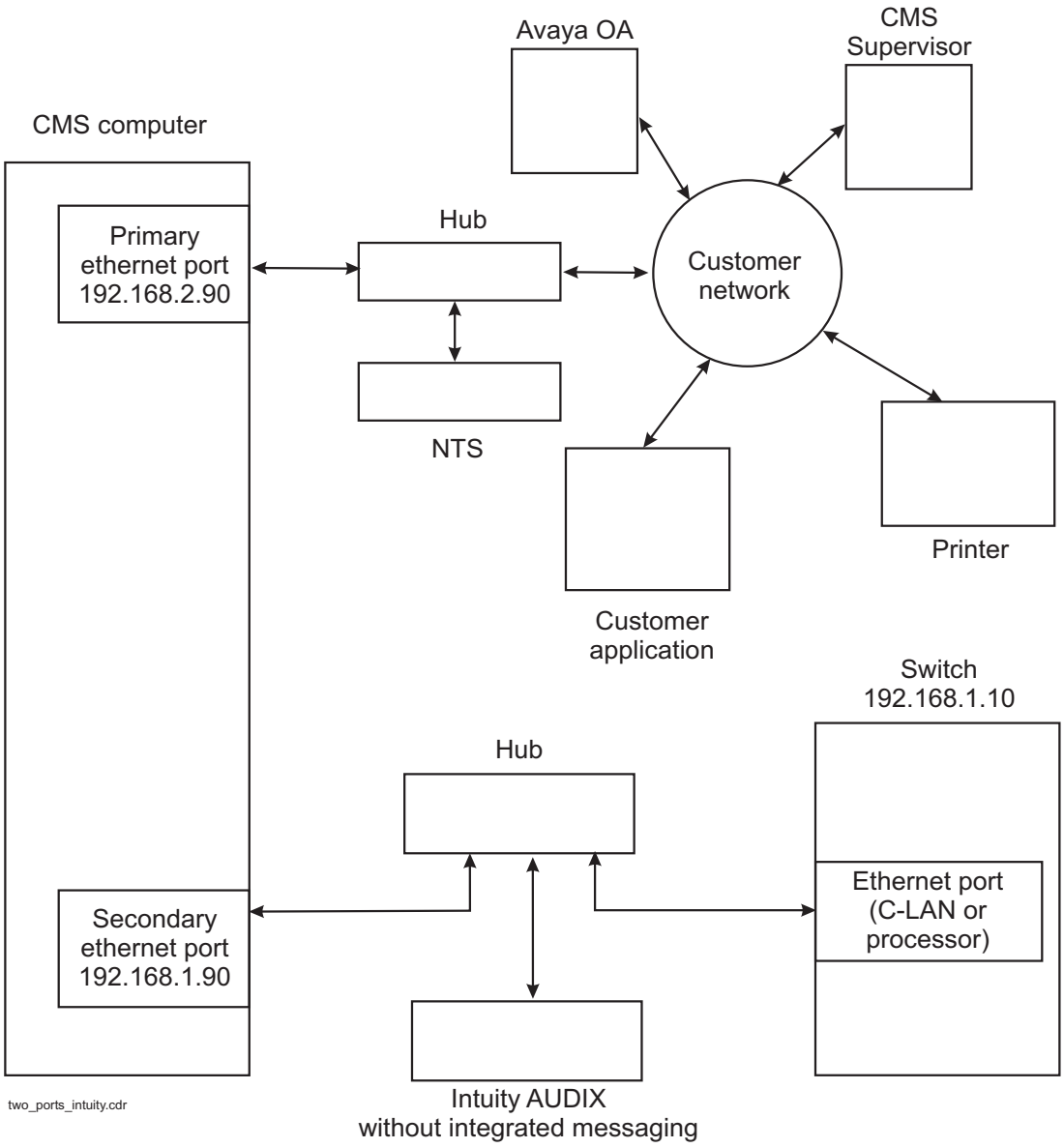
Two ethernet ports on CMS computer

If the CMS computer is using a LAN for both switch link traffic and connections to CMS Supervisor, Avaya OA, and other network applications, the CMS computer should be equipped with two ethernet ports. In this configuration, the primary ethernet port is used for all non-switch applications. The secondary ethernet port is dedicated for carrying switch link traffic. This link can be connected using either a LAN hub or a crossover cable. Each ethernet port must be administered on different networks, so switch-to-CMS traffic does not mix with other traffic.



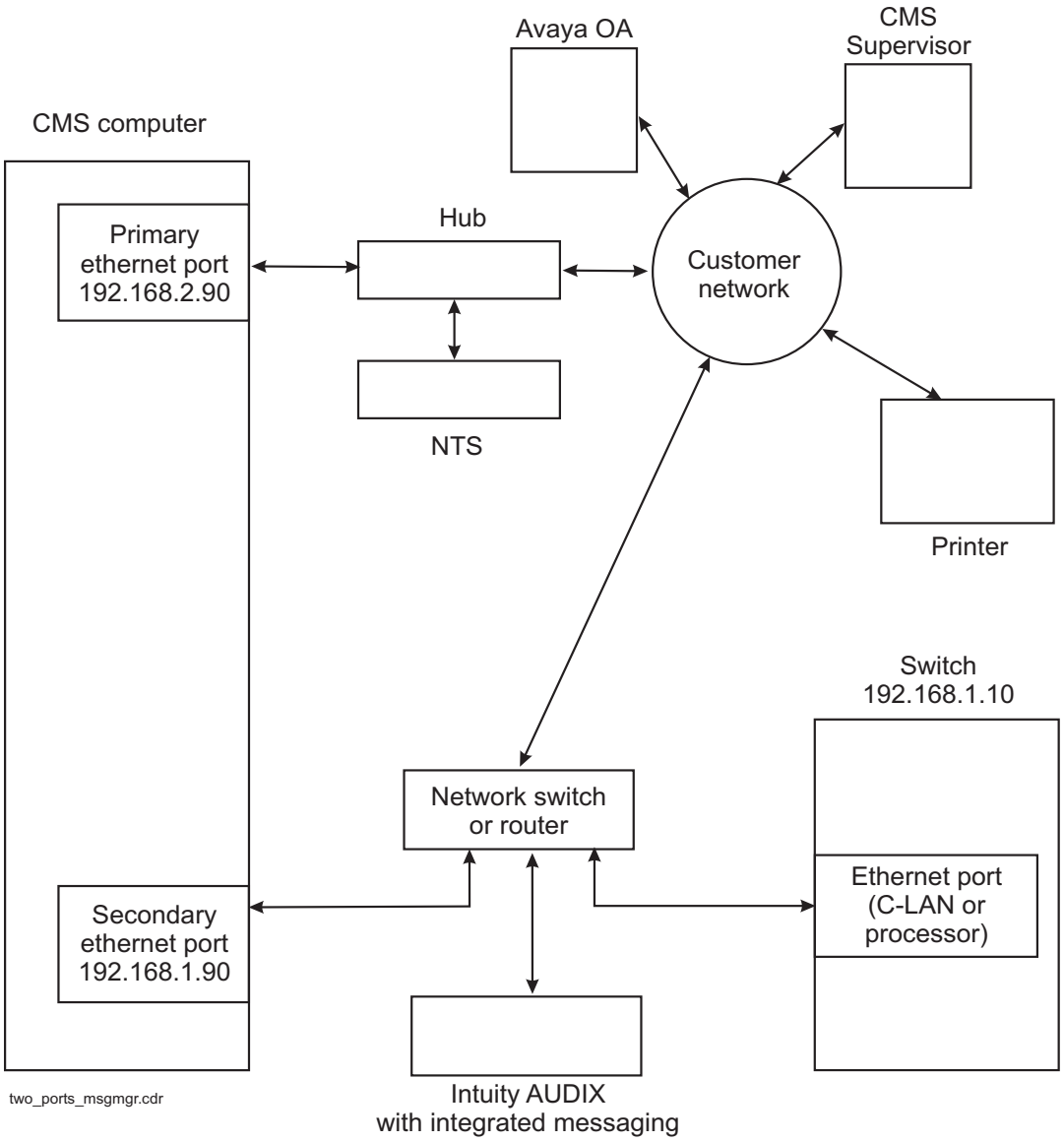
Integrating Intuity AUDIX on the link

This configuration shows how you can integrate an Intuity AUDIX system (without integrated messaging) as part of the switch-to-CMS link. The additional traffic load should not cause any loss of data on the link.



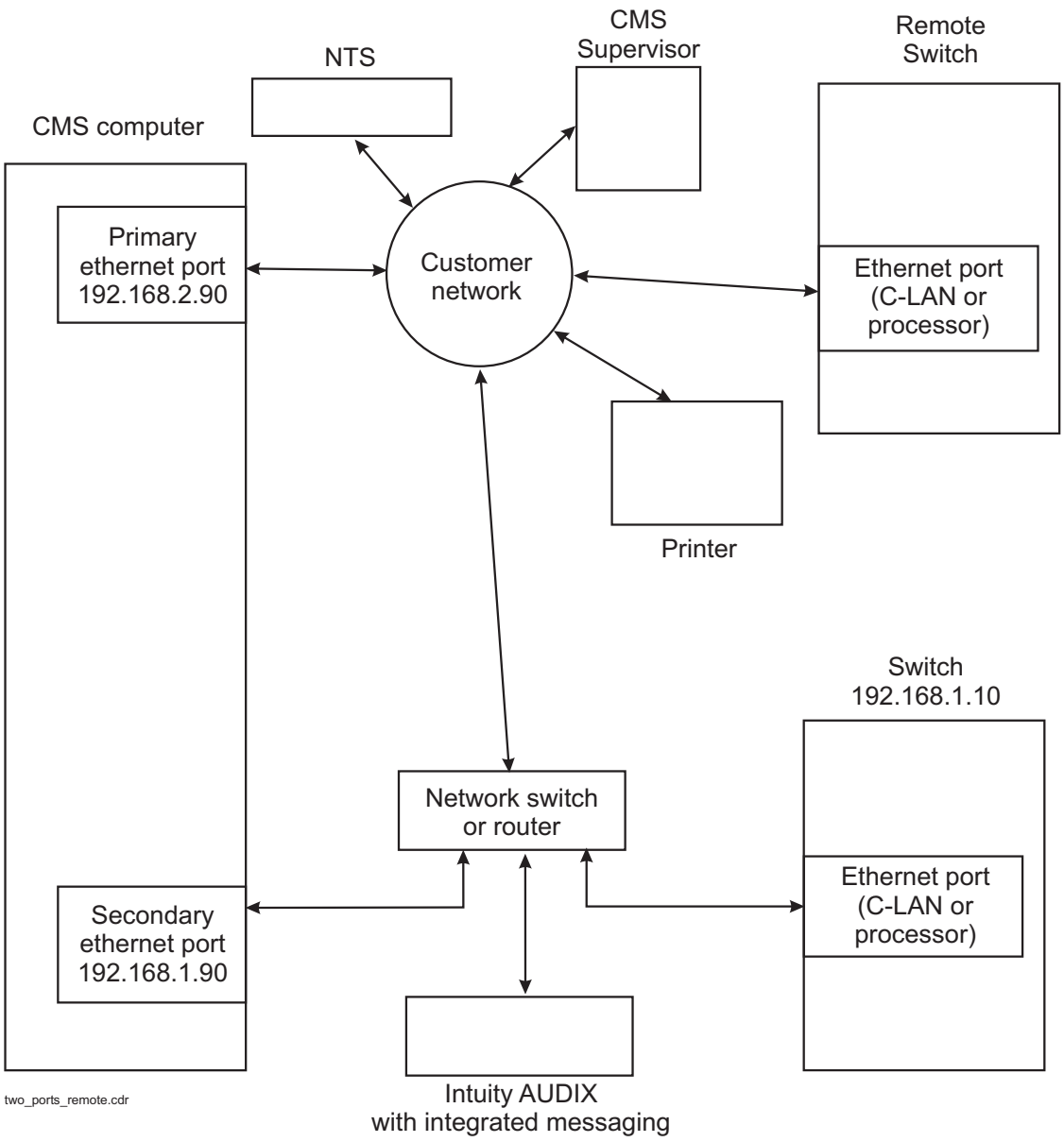
Intuity AUDIX with integrated messaging traffic on the customer network

This configuration does have a connection to the customer network. However, the bulk of the traffic is isolated from the switch link using the router and a network switch. The router and network switch separate the integrated messaging traffic originating by the customer PCs from the switch link traffic.



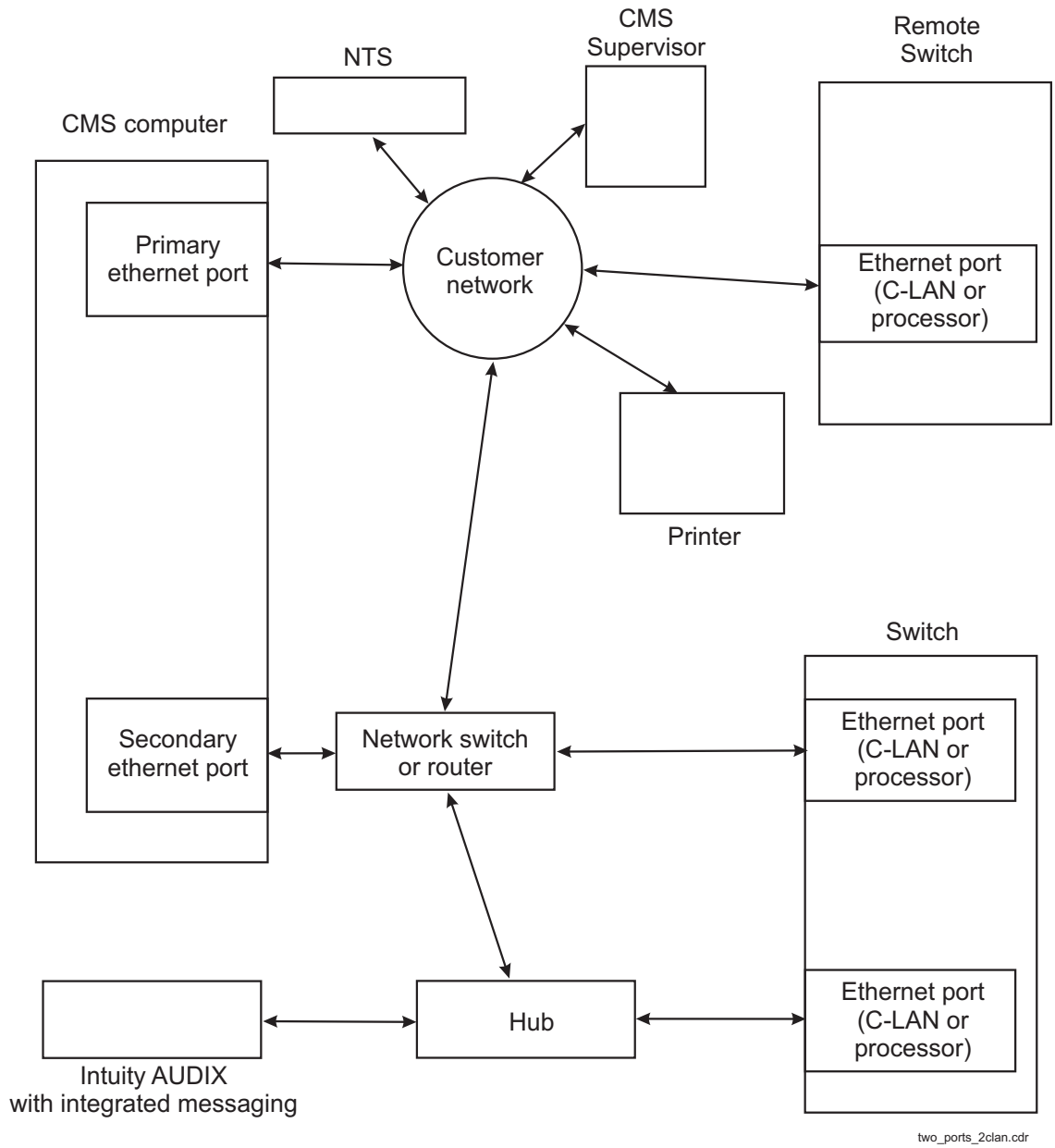
Remote switch on the customer network

A remote switch can also be connected through the customer network. using a router and a network switch to isolate the switch link traffic from the Message Manager traffic and the other customer network traffic.



Two ethernet ports option

This configuration shows the best way to isolate the CMS and Intuity links to the switch. This configuration uses two ethernet ports on the switch. A router must be used to send traffic from the customer network to the Intuity, or if there is a remote switch that connects to the CMS computer. For true link isolation, this is the best option available.

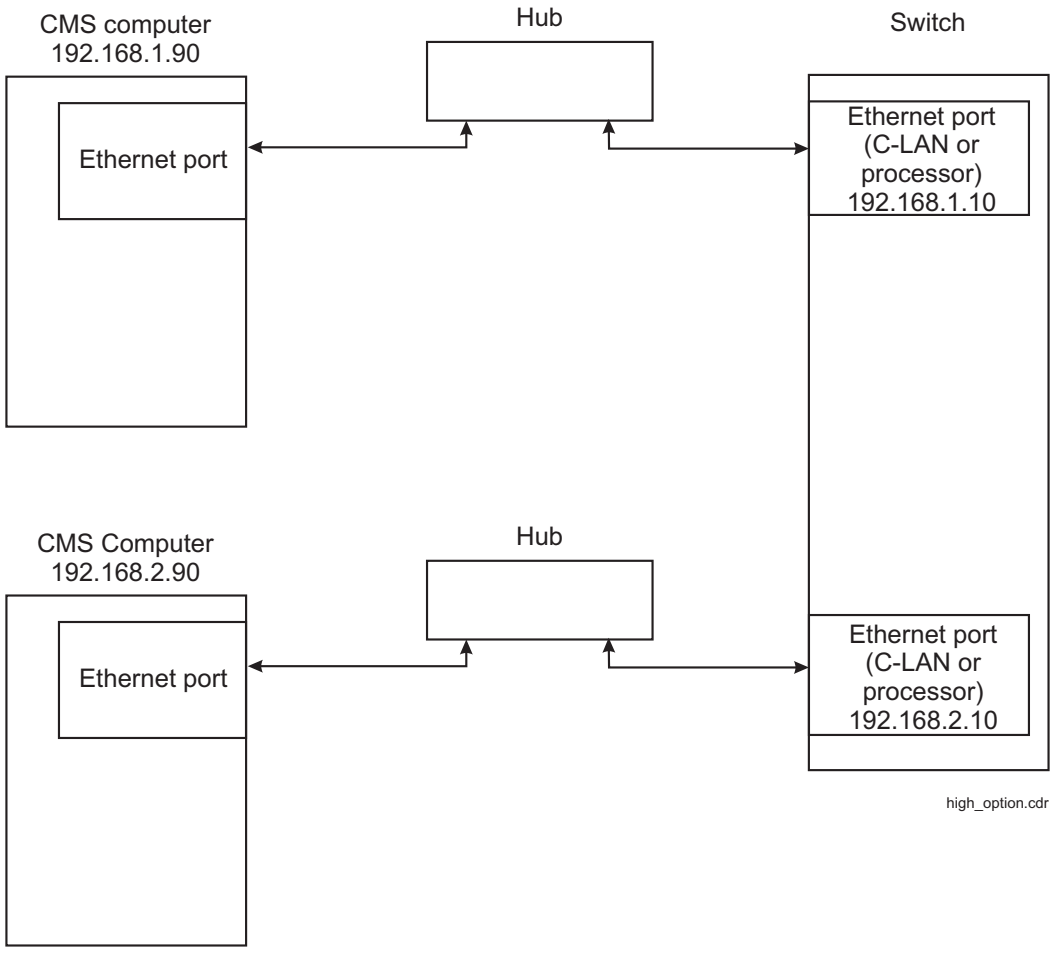


High availability option

The High Availability option uses dual links from the switch to different CMS computers. This option helps ensure that CMS data is not lost if one of the links goes down or if one of the CMS computers goes down. This option is available on CMS R3V8 or later, and switch release R8 or later equipped with two ethernet ports. The following figure shows a typical High Availability configuration. Though not shown here, a second ethernet port on the CMS computers can be used to isolate the NTS, printer, and CMS Supervisor traffic.

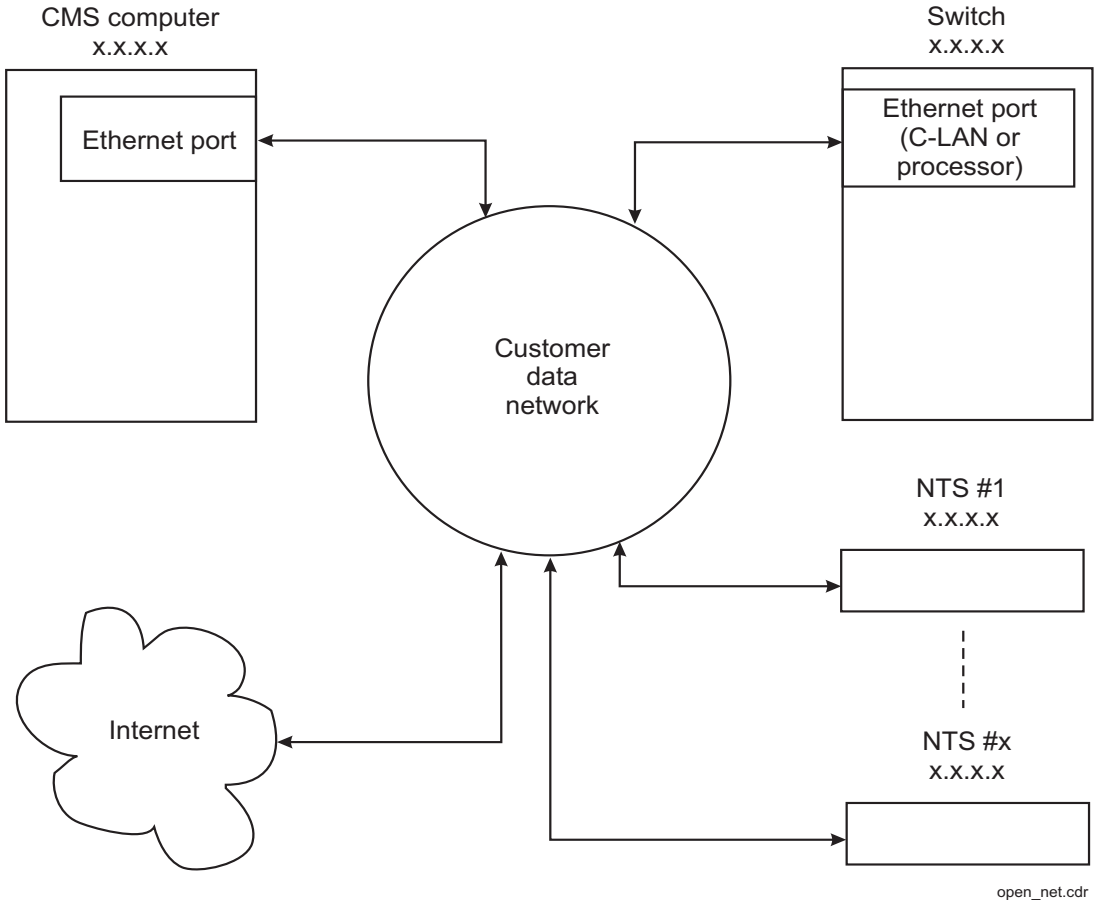
Note:

For the S8300 Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.



Public network

In a public network where the customer is connected to the Internet, the default IP addressing cannot be used. You must administer IP addressing based on the customer requirements. For switch-to-CMS traffic, this setup is the least desirable way to set up a switch link because of potential message loss on a network that has too much traffic.



Connecting with a crossover cable

The direct LAN connection is the most basic method to connect the switch to the CMS computer. Any NTSs must connect to a separate ethernet port on the CMS computer.

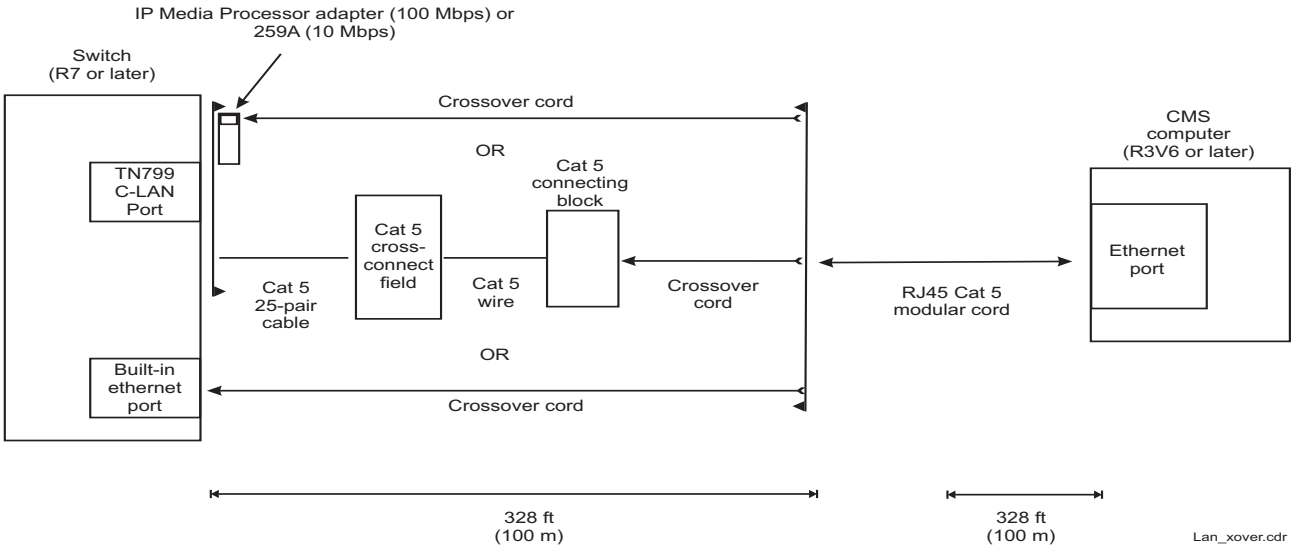
Distance limits

The distance limit for a direct LAN connection is 328 feet (100 meters).

Parts list

Quantity	Description
1	TN799 C-LAN port
1	259A adapter (102631413), or 258B adapter (103923025), or 356A adapter (104158829), or Category 5 cross-connect hardware and connecting block
1	6-inch RJ45 crossover cable (846943306 or 104154414)
1	RJ45 UTP Category 5 modular cord 107748063 (5 feet, 1.5 meters) 107748105 (10 feet, 3 meters) 107748188 (15 feet, 4.5 meters) 107742322 (25 feet, 7.6 meters) 107742330 (50 feet, 15.2 meters) 107748238 (100 feet, 30.5 meters) 107748246 (200 feet, 61 meters) 107748253 (300 feet, 91 meters)
1	Ethernet port on the CMS computer

Cabling diagram - LAN via crossover cable



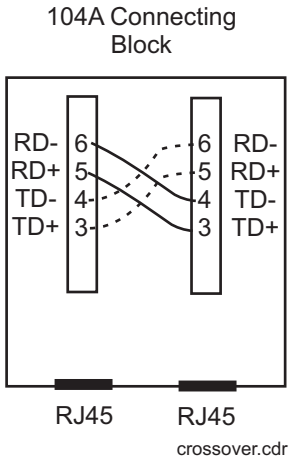
Cabling procedure

To connect the switch to a CMS computer using a crossover cable:

1. Do one of the following:
   - Attach an adapter (259A, 258B, or 356A) to the backplane connector of the TN799 C-LAN circuit pack, then attach the plug end of the crossover cable to the adapter. Use jack #1 on the 258B or 356A adapters.
   - Connect the ethernet port of a TN799 C-LAN circuit pack to a Category 5 connecting block using Category 5 cross-connect wiring, then attach the plug end of the crossover cable to the connecting block.
2. Connect one end of an RJ45 Category 5 modular cord to the receptacle end of the crossover cable.
3. Connect the other end of the modular cord to an ethernet port on the CMS computer.

Crossover wiring

If the standard crossover cable is not available, you can build your own crossover wiring arrangement to flip the transmit and receive leads 3/5 and 4/6 for the LAN connection. The following figure shows how this can be done with a 104A connecting block (Material ID 105164859). When using this device, the distance limit from the switch to the CMS computer is 328 feet (100 meters). From this device, you would connect one RJ45 Category 5 modular cord to the switch C-LAN circuit pack, and another RJ45 Category 5 modular cord to the CMS computer ethernet port.



Connecting with a LAN hub or router

The LAN hub or router connection is the recommended method to connect the switch to the CMS computer. The hub or router can be used to connect to more than one switch (multiple ACDs), and to connect to NTS units.

This section includes the following topics:

Distance limits

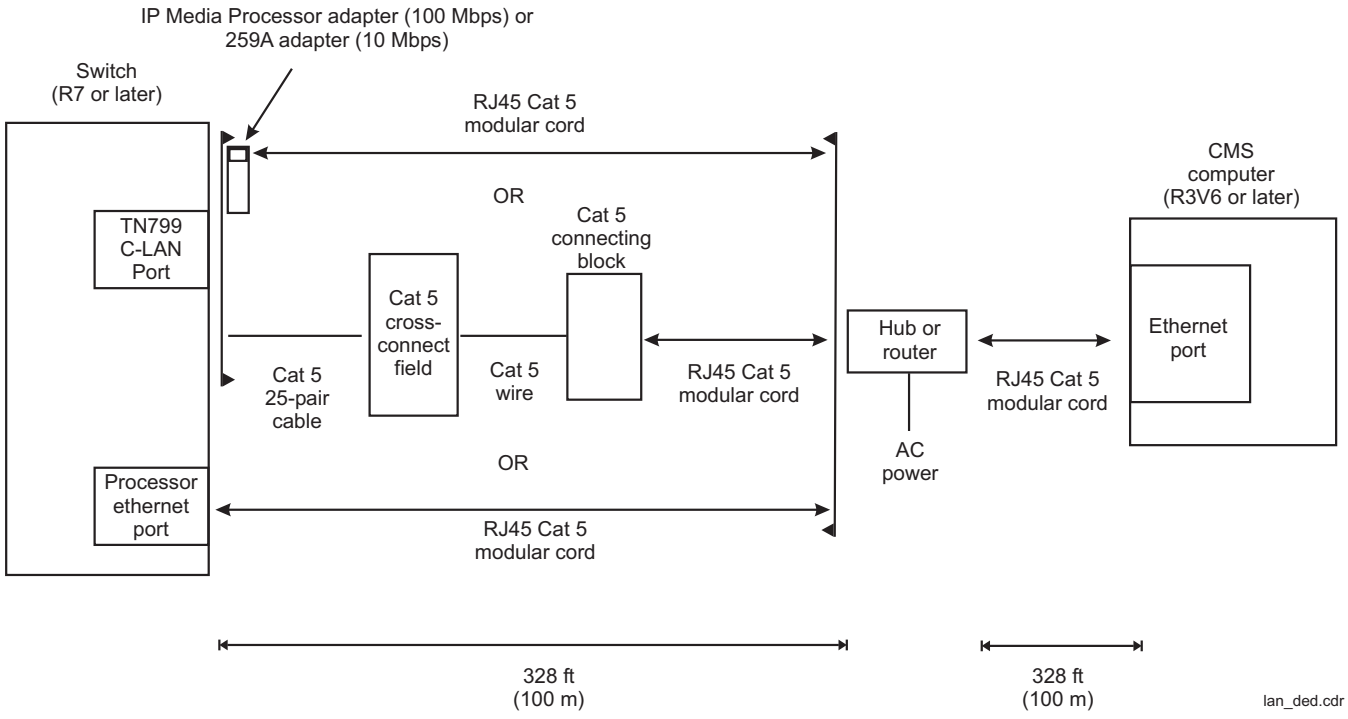
The distance limit for a single hub or router LAN connection is 328 feet (100 meters) from the switch to the hub or router, and another 328 feet (100 meters) from the hub or router to the CMS computer. If the distance between the switch and the CMS computer is more than 328 feet (100 meters), you can daisy-chain up to four separate hubs or routers.

Parts list

Quantity	Description
1	Ethernet port on the switch (TN799 C-LAN or processor ethernet port)
1	IP Media Processor adapter for 100 Mbps (848525887), or 259A adapter for 10 Mbps (102631413), or Category 5 cross-connect hardware and connecting block
2	RJ45 UTP Category 5 modular cord 107748063 (5 feet, 1.5 meters) 107748105 (10 feet, 3 meters) 107748188 (15 feet, 4.5 meters) 107742322 (25 feet, 7.6 meters) 107742330 (50 feet, 15.2 meters) 107748238 (100 feet, 30.5 meters) 107748246 (200 feet, 61 meters) 107748253 (300 feet, 91 meters)

Quantity	Description
1	LAN hub or router
1	Ethernet port on the CMS computer

Cabling Diagram - LAN via hub or router



Cabling procedure

To connect the switch to a CMS computer using a LAN hub:

1. Do one of the following depending on your hardware configuration:
   - Attach an adapter (IP Media Processor or 259A) to the backplane connector of the TN799 C-LAN circuit pack. Attach one end of an RJ45 Category 5 modular cord to the adapter.
   - Connect the ethernet port of a TN799 C-LAN circuit pack to a Category 5 connecting block using Category 5 cross-connect wiring. Attach one end of an RJ45 Category 5 modular cord to the connecting block.
   - Attach one end of an RJ45 Category 5 modular cord to the processor ethernet port on the switch. On the Avaya IP600, DEFINITY One, and S8100 Server, the processor ethernet port is found on the processor interface cable assembly of the TN2314 processor circuit pack.
   - Attach one end of an RJ45 Category 5 modular cord to either the EXT1 or EXT2 ethernet port on a G700 Media Gateway. A G700 Media Gateway can be controlled by either an S8300 Server or an S87xx Server.
2. Connect the other end of the modular cord to a port on the LAN hub or router.
3. Connect another RJ45 Category 5 modular cord to a different port on the LAN hub or router.
4. Connect the other end of the modular cord to an ethernet port on the CMS computer.
5. Connect and apply power to the LAN hub or router.

Connecting over a customer LAN

Using a customer network is another method to connect a switch to the CMS computer. This method is not recommended except in special cases. The LAN hub or router method should be used for most installations.

This section includes the following topics:

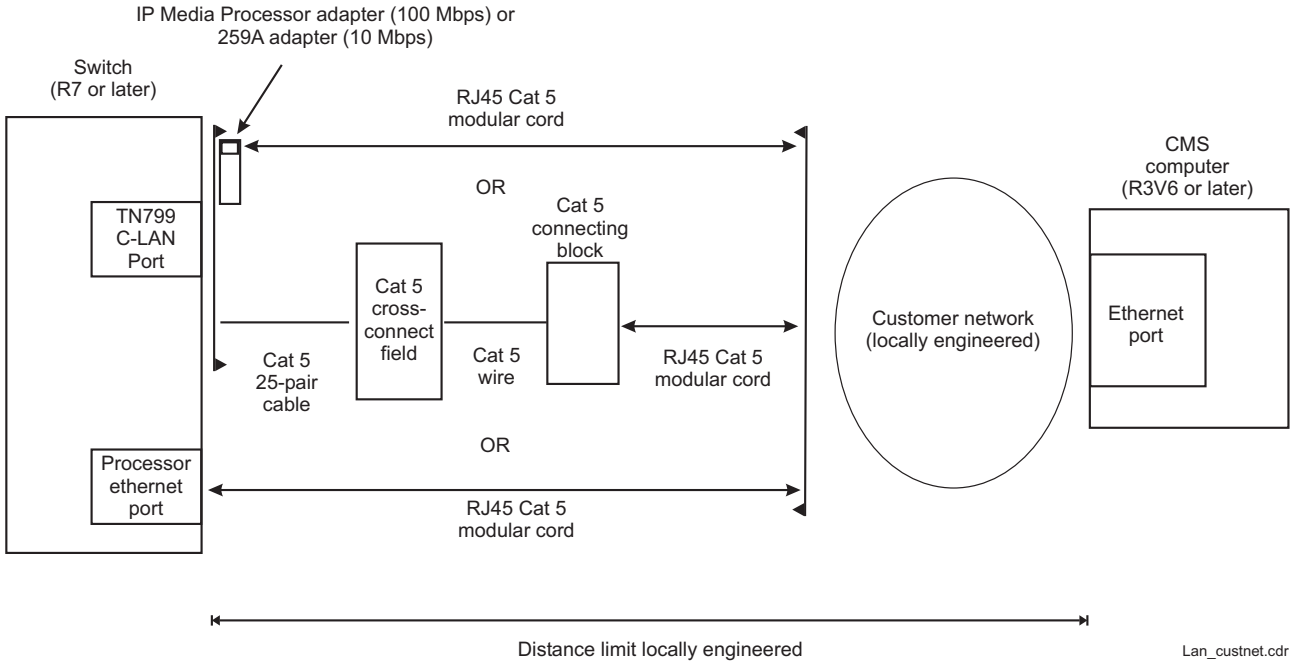
Distance limits

The distance limit using a customer network must be locally engineered.

Parts list

Quantity	Description
1	Ethernet port on the switch (TN799 C-LAN or processor ethernet port)
1	IP Media Processor adapter for 100 Mbps (848525887), or 259A adapter for 10 Mbps (102631413), or Category 5 cross-connect hardware and connecting block
1	RJ45 UTP Category 5 modular cord 107748063 (5 feet, 1.5 meters) 107748105 (10 feet, 3 meters) 107748188 (15 feet, 4.5 meters) 107742322 (25 feet, 7.6 meters) 107742330 (50 feet, 15.2 meters) 107748238 (100 feet, 30.5 meters) 107748246 (200 feet, 61 meters) 107748253 (300 feet, 91 meters)
1	Ethernet port on the CMS computer

Cabling diagram - customer LAN



Cabling procedure

To connect the switch to a CMS computer using a customer LAN:

1. Do one of the following depending on your hardware configuration:
   - Attach an adapter (IP Media Processor or 259A) to the backplane connector of the TN799 C-LAN circuit pack. Attach one end of an RJ45 Category 5 modular cord to the adapter.
   - Connect the ethernet port of a TN799 C-LAN circuit pack to a Category 5 connecting block using Category 5 cross-connect wiring. Attach one end of an RJ45 Category 5 modular cord to the connecting block.
   - Attach one end of an RJ45 Category 5 modular cord to the processor ethernet port on the switch. On the Avaya IP600, DEFINITY One, and S8100 Server, the processor ethernet port is found on the processor interface cable assembly of the TN2314 processor circuit pack.
   - Attach one end of an RJ45 Category 5 modular cord to either the EXT1 or EXT2 ethernet port on a G700 Media Gateway. A G700 Media Gateway can be controlled by either an S8300 Server or an S87xx Server.
2. Connect the other end of the modular cord to a port on the customer data network.
3. Connect from the customer data network to an ethernet port the CMS computer.

Administering a TCP/IP switch link

This section provides the procedures to administer TCP/IP over a LAN.

This section includes the following topics:

Overview

The CMS application can collect and process Automatic Call Distribution (ACD) data from an Avaya switch. However, before CMS can collect and process the ACD data, a special hardware interface on the switch must be properly administered. Each switch can use a number of different interfaces to communicate to a CMS computer.

For additional information about switch administration, refer to the appropriate switch administration documents.

This section includes the following topics:

Local vs remote connections

The switch and the CMS computer can be connected in local and remote arrangements. For clarification, these arrangements are defined as follows:

- Local - The connections between the switch and the CMS computer use facilities local to the switch, such as a direct connection over a LAN.
- Remote - The connections between the switch and the CMS computer use WAN.

Multiple ACDs (switches)

One CMS computer can collect data from up to eight different switches. From the CMS computer point of view, each switch represents one ACD. Each switch requires a link to the CMS computer.

High availability option

The High Availability option provides dual links between the switch and two separate CMS computers. If the customer has purchased the High Availability option, you must connect a link from one C-LAN circuit pack or processor ethernet port to one CMS computer, and a second link from a different C-LAN circuit pack or processor ethernet port to another CMS computer. The High Availability option is not allowed using X.25 links.

Note:

For the S8300 Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.

Planning for TCP/IP switch links

When setting up a switch link using TCP/IP over a LAN, planning information must be gathered before you begin. In particular, you must take into account if the LAN connection includes both a connection to CMS, Intuity AUDIX with integrated messaging, and Avaya Operational Analyst (OA). Some of the information needed includes:

- How is the connection being made from the CMS computer to the switch?
  - Private LAN, no connectivity to customer LAN (uses private LAN addresses).
    - Preferred method, most robust and reliable, no dependency on customer's network
    - A dedicated LAN port on the CMS computer provides the switch link
    - The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link
    - If desired, a second ethernet port can be used to provide additional isolation for the CMS link
    - A dedicated LAN hub to connect the links.
  - Customer LAN with private segment.
    - Uses a network switch or router to provide a private network or network segment
    - Minimal dependency on customer's network
    - A dedicated LAN port on the CMS computer provides the switch link
    - The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link
    - Customer must provide equipment and administer network for private segment
    - Customer LAN administrator must be present during setup.
  - Direct connect to Customer LAN, without private segment.
    - Least preferred method
    - Complete dependency on performance and reliability of customer's LAN
    - Allows remote location of endpoints when customer LAN connectivity is convenient
    - Customer LAN administrator must be present during setup.

- If the customer LAN is used, the following information is needed from the customer:
  - Customer network physical connectivity:
    - Location of network access point (hub, router, and so on)
    - Distance between the ethernet port on the switch and the network access point (328 ft, 100 m maximum)
    - Wiring to access point, existing or new, Category 5 minimum required.
  - Customer network administration:
    - IP address of switch ethernet ports, CMS computer, Intuity, and gateways
    - Node names of switch ethernet ports, CMS computer, Intuity, and gateways
    - Subnet masks for all LAN segments containing switch ethernet ports or adjuncts
    - Gateway IP address for all LAN segments containing switch ethernet ports, adjuncts, or routers
    - Are all endpoints (switch ethernet ports and adjuncts) on the same local LAN segment?
    - Network routes.

    Network administration information needs to be mapped into specific administration fields.
- Sanity check of information obtained from customer:
  - If switch and adjuncts are on different LAN subnets (recommended), gateway IP addresses are different
  - If switch and adjuncts (CMS or Intuity) are on the same LAN subnet (not recommended):
    - Gateway IP address (if present) and subnet mask information is valid
    - All IP addresses contain the same subnet address

Without the above information, the technician may not be able to complete the installation. Installations that require the technicians to return because information was not available incur additional charges.

Administering the link at the CMS

In addition to the switch administration presented in this section, you must also set up the switch link on the CMS computer using the **swsetup** option of the **cmssvc** command. This procedure is documented in your CMS software installation document.

To set up the switch link:

1. Using the **cmssvc** command, turn off CMS.
2. Using the **cmssvc** command, access the **swsetup** option. When you access this option, you are queried for the following information:
   - Switch name
   - Switch model (see Determining switch and CMS compatibility on page 47)
   - Is Vectoring enabled on the switch (if authorized)?
   - Is Expert Agent Selection (EAS) enabled on the switch (if authorized)?
   - Does the Central Office have disconnect supervision?
   - Local and remote port

     The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for the link. For example, if you use processor channel 10, set the local and remote port to 10.
   - Transport method used to connect to the switch (X.25 or TCP/IP). For TCP/IP, the IP address or hostname, and TCP port (the default is 5001).

If the CMS computer has two ethernet ports, it is possible that the system might attempt to route packets from one interface to another. To prevent this, edit the **/etc/rc2.d/S98cms_ndd** file and add the following line to the end of the file:

```
ndd -set /dev/ip ip_forwarding 0
```

If the file already has this line, quit out of the file and make no changes.

Administering the CMS and switch release options

This section contains release option administration that must be done before you administer the switch to CMS computer link. The following administration must be done:

Determining switch and CMS compatibility

The following table reflects the recommended settings for the G3 Version, Call Center Release, Adjunct CMS Release, and CMS Setup switch type based on the software release of the switch. You can set the G3 Version, Call Center Release, or Adjunct CMS Release to an earlier version, but you will not have access to all of the features of the recommended release.

Switch software release	Switch administration			CMS administration
	G3 Version	Call Center Release	Reporting Adjunct Release	CMS setup switch model
DEFINITY R9.1, R9.2[1]	V9	9.1 or later	R3V9	Definity-R9/10
Avaya Call Processing R9.5, R10.x	V10	9.1 or later	R3V9	Definity-R9/10
Communication Manager 1.x	V11	11.1 or later	R3V11	MultiVantage-R11
Communication Manager 2.x	V12	12.0 or later	R12[2]	Communication Mgr 2
Communication Manager 3.0	V13	3.0[3]	R13	Communication Mgr 3.0
Communication Manager 3.1	V13	3.1	R13.1	Communication Mgr 3.1
Communication Manager 4.0	V14	4.0	R14	Communication Mgr 4/5
Communication Manager 5.0	V15	5.0	R14	Communication Mgr 4/5
Communication Manager 5.1	V15	5.1	R14	Communication Mgr 4/5
Communication Manager 5.2	V15	5.2	R15	Communication Mgr 5.2
Communication Manager 5.2.1	V16	5.2	R16	Communication Mgr 5.2

1. R9 is not a bugfix load.
2. Beginning the CMS R12, the release numbering scheme dropped the "3V" designation. For example, instead of CMS R3V12, it is now CMS R12.
3. Beginning with Communication Manager 3.0, the Call Center release numbering has been realigned to match the same release numbering scheme.

Verifying the software version

Use the System Parameters Customer Options form to verify the software version. If the software version is not correct, apply a new license file that has the correct version.

```
display system-parameters customer-options                    Page   1 of  11
                            OPTIONAL FEATURES

    G3 Version: VXX                          RFA System ID (SID): 1
      Location: 1                            RFA Module ID (MID): 1
      Platform: 6

                                                          USED
                              Platform Maximum Ports: 10000 2756
                                    Maximum Stations: 450   22
                               Maximum XMOBILE Stations: 100   5
                   Maximum Off-PBX Telephones - EC500: 5     0
                   Maximum Off-PBX Telephones -   OPS: 0     0
                   Maximum Off-PBX Telephones - SCCAN: 0     0




        (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
G3 Version	Enter the appropriate software release of the switch. If you set this field to an earlier release number, you will not have access to the latest features. Apply a new license file that has the correct version. The G3 Version must be set to **V8** or later to use the High Availability option.

Verifying the call center release

Use the first Call Center Optional Features page of the System Parameters Customer Options form to set the Call Center Release. If the release number is not correct, apply a new license file that has the correct version.

```
display system-parameters customer-options                      Page   6 of  11
                        CALL CENTER OPTIONAL FEATURES

                          Call Center Release: X.X

                               ACD? y                        Reason Codes? y
                      BCMS (Basic)? y              Service Level Maximizer? n
         BCMS/VuStats Service Level? y            Service Observing (Basic)? y
  BSR Local Treatment for IP & ISDN? n     Service Observing (Remote/By FAC)? y
                  Business Advocate? y             Service Observing (VDNs)? y
                    Call Work Codes? y                         Timed ACW? y
      DTMF Feedback Signals For VRU? n                  Vectoring (Basic)? y
                  Dynamic Advocate? n                Vectoring (Prompting)? y
       Expert Agent Selection (EAS)? y             Vectoring (G3V4 Enhanced)? y
                            EAS-PHD? y              Vectoring (3.0 Enhanced)? n
                  Forced ACD Calls? n     Vectoring (ANI/II-Digits Routing)? y
                                          Vectoring (G3V4 Advanced Routing)? y
          Lookahead Interflow (LAI)? y                  Vectoring (CINFO)? y
Multiple Call Handling (On Request)? n      Vectoring (Best Service Routing)? y
    Multiple Call Handling (Forced)? n                 Vectoring (Holidays)? y
  PASTE (Display PBX Data on Phone)? y                Vectoring (Variables)? y
        (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
Call Center Release	Enter a Call Center Release number that matches the set of Call Center features you want to use. If you set this field to something other than your current Call Center load, you will not have access to the latest Call Center features. Apply a new license file that has the correct version. **Note:** Beginning with Communication Manager 3.0, the Call Center release numbering has been realigned to match the same release numbering scheme.

Setting the adjunct CMS release (Communication Manager 3.0 and earlier)

Use the following page of the System Parameters Features form to set the Adjunct CMS Release. Depending on the switch software release, this field will be found on different pages.

```
change system-parameters features                              Page  12 of  15
                        FEATURE-RELATED SYSTEM PARAMETERS

  AGENT AND CALL SELECTION
                          MIA Across Splits or Skills? y
                           ACW Agents Considered Idle? y
                           Call Selection Measurement: predicted-wait-time
    Service Level Supervisor Call Selection Override? y
                                  Auto Reserve Agents: none
ASAI
            Copy ASAI UUI During Conference/Transfer? n
        Call Classification After Answer Supervision? n
                                    Send UCID to ASAI? n
CALL MANAGEMENT SYSTEM
                                  Adjunct CMS Release: RXX

                               BCMS/VuStats LoginIDs? y
                   BCMS/VuStats Measurement Interval: half-hour
           BCMS/VuStats Abandon Call Timer (seconds): 2
                     Validate BCMS/VuStats Login IDs? n
                             Clear VuStats Shift Data: on-login
                  Remove Inactive BCMS/VuStats Agents? n
```

Field	Definition
Adjunct CMS Release	Enter the software release of the CMS computer. If you set this field to an earlier release number, you will not have access to the latest CMS features. **Note:** Beginning with CMS R12, the release numbering scheme dropped the "3V" designation. For example, instead of R3V12, it is now R12.

Setting the reporting adjunct release (Communication Manager 3.1 and later)

Use the following page of the System Parameters Features form to set the Reporting Adjunct Release. Depending on the switch software release, this field will be found on different pages.

```
change system-parameters features                              Page  12 of  17
                        FEATURE-RELATED SYSTEM PARAMETERS

  AGENT AND CALL SELECTION
                          MIA Across Splits or Skills? y
                           ACW Agents Considered Idle? y
                           Call Selection Measurement: predicted-wait-time
    Service Level Supervisor Call Selection Override? y
                                  Auto Reserve Agents: none
ASAI
            Copy ASAI UUI During Conference/Transfer? n
        Call Classification After Answer Supervision? n
                                    Send UCID to ASAI? n
CALL MANAGEMENT SYSTEM
                             Reporting Adjunct Release: XXX

                                BCMS/VuStats LoginIDs? y
                    BCMS/VuStats Measurement Interval: half-hour
            BCMS/VuStats Abandon Call Timer (seconds): 2
                      Validate BCMS/VuStats Login IDs? n
                             Clear VuStats Shift Data: on-login
                  Remove Inactive BCMS/VuStats Agents? n
```

Field	Definition
Reporting Adjunct Release	Enter the software release of the CMS computer. If you set this field to an earlier release number, you will not have access to the latest CMS features. **Note:** Beginning with CMS R12, the release numbering scheme dropped the "3V" designation. For example, instead of R3V12, it is now R12.

Administering data collection options

In addition to administering the switch link described in this document, you must also administer and understand the following data collection options:

- Enable CMS measuring for hunt groups, trunk groups, and VDNs
- Assign measured extensions and multiple splits or skills
- Measured trunks versus unmeasured facilities
- Interactions with CMS measurements and IP trunk groups

For more details about these data collection options, see the Call Management System section of "ACD contact center features" in *Avaya Call Center Automatic Call Distribution (ACD) Guide*.

Administering a TCP/IP connection

The administration for a TCP/IP connection over a LAN is different if you are using a C-LAN circuit pack or if you are using a processor ethernet port as described in Ethernet ports on the switch on page 18.

This section includes the following topics:

Administering a C-LAN connection

Use the procedures in this section to administer a TCP/IP connection to a C-LAN circuit pack. This section contains examples of the administration forms with detailed explanations for the required fields. Use the forms in the order shown.

Form	Purpose
change system-parameter maintenance (G3csi, DEFINITY Server CSI, DEFINITY One, and S8100 Server only)	Adding a second packet interface
add data-module	Adding an ethernet data module
change node-names ip	Adding node names and IP addresses
change ip-intefaces	Adding a C-LAN IP interface
change communication-interface processor-channels	Adding the processor interface channels
add ip-route	Adding IP routes (if needed)

Note:

If the customer has purchased the High Availability option, you must administer a link from one ethernet port on the switch to one CMS computer, and a second link from a different ethernet port on the switch to another CMS computer.

This section includes the following topics:

Adding a second packet interface

Use the Maintenance-Related System Parameters form to add a second packet interface. This is only required on G3csi, DEFINITY Server CSI, DEFINITY One, or S8100 Server.

```
change system-parameter maintenance                              Page 2 of 3
MAINTENANCE-RELATED SYSTEM PARAMETERS

MINIMUM MAINTENANCE THRESHOLDS ( Before Notification )
        TTRs: 4        CPTRs: 1        Call Classifier Ports: 0
        MMIs: 0          VCs: 0

TERMINATING TRUNK TRANSMISSION TEST ( Extension )
   Test Type 100:           Test Type 102:           Test Type 105:

ISDN MAINTENANCE
   ISDN-PRI Test Call Extension: 30999     ISDN-BRI Service SPID:

DS1 MAINTENANCE
   DS0 Loop-Around Test Call Extension:

SPE OPTIONAL BOARDS
                     Packet Intf1? y     Packet Intf2? y
   Bus Bridge: 01A03   Inter-Board Link Timeslots  Pt0: 6  Pt1: 1  Pt2: 1
```

Field	Definition
Packet Intf2	Enter **y** to add a second packet interface.
Bus Bridge	Enter the equipment location of the C-LAN circuit pack that does the bus bridge functionality when the packet bus is activated. This must be administered for the C-LAN to work.
Inter-Board Link Timeslots - The total number of timeslots allocated cannot greater than 11.	
Inter-Board Link Timeslot Pt0	Enter the number of timeslots (1-9) used by this port. Port 0 carries the bulk of messaging traffic between the switch and the CMS. The default of **6** should be adequate, but can be increased if needed to improve traffic flow.
Inter-Board Link Timeslot Pt1	Enter the number of timeslots (1-3) used by this port. Port 1 is a low traffic port and should always be set to **1**.
Inter-Board Link Timeslot Pt2	Enter the number of timeslots (1-3) used by this port. Port 2 is a low traffic port and should always be set to **1**.

Adding node names and IP addresses

Use the Node Names form to assign the name and IP address of the CMS computer and any switches that are networked with the CMS computer. With the High Availability option, you will assign two switch node names and two CMS computer node names.

```
change node-names ip                                          Page   1 of   1
                                  IP NODE NAMES
    Name                 IP Address          Name               IP Address
3net                  192.168.3  .0                              .   .   .
cmshost               192.168.1  .90                             .   .   .
cmshost2              192.168.3  .90                             .   .   .
default               0  .0  .0  .0                             .   .   .
gateway               192.168.1  .211                            .   .   .
gateway2              192.168.4  .211                            .   .   .
switchhost            192.168.1  .10                             .   .   .
switchhost2           192.168.4  .10                             .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
                         .   .   .                               .   .   .
( 8  of  8 administered node-names were displayed )
Use ‘list node-names’ command to see all the administered node-names
Use ‘change node-names ip xxx’ to change a node-name ‘xxx’ or add a node-name
```

Field	Definition
Name	Enter the host name of the CMS computer, any switches that are networked with the CMS computer, and any gateway hosts used in the network. The node names can be entered in any order. The names are displayed in alphabetical order the next time the form is displayed. The `default` node name entry is display-only and is not used for this application. For consistency, use the CMS computer host name as defined during the CMS Setup procedure. See your CMS software installation document for more information. These names are also used in the IP interfaces, data module, IP routing, and other forms. If you change the node name in this form, it is automatically updated on the other forms. **Note:** Do not use special characters in the node name. Special characters are not allowed in the **`/etc/hosts`** file on the CMS computer.
IP Address	Enter the IP address of the CMS computer, the switches, and any required gateways.  **CAUTION:** Plan out the network before you assign any IP addresses. Any future changes that require a change to IP addresses will cause a service disruption.

Adding a C-LAN IP interface

Use the IP Interfaces form to assign a C-LAN circuit pack as an IP interface. With the High Availability option, you will assign two separate C-LAN IP interfaces.

CAUTION:
If the IP interface is already administered, do not change the administration. Changing the administration could cause failure with IP telephones and other adjunct links.

```
change ip-interface XXyXX                                      Page   1 of   1

                                 IP INTERFACES



                  Type: C-LAN                          ETHERNET OPTIONS
                  Slot: XXyXX                             Auto? n
           Code/Suffix: TN799  D                         Speed: 10Mbps
             Node Name: clan-iptarts1                   Duplex: Half
            IP Address: 10 .100.100.99
           Subnet Mask: 255.0  .0  .0
       Gateway Address: 10 .100.100.254
  Enable Ethernet Port? y
        Network Region: 10
                  VLAN: n

Number of CLAN Sockets Before Warning: 400
```

Field	Definition
Enabled	Enter **y** to enable the C-LAN IP interface. After initial administration, you must disable the interface before you make any changes.
Type	Enter **C-LAN**.
Slot	Enter the equipment location of the C-LAN circuit pack.
Code/Sfx	This is a display-only field that shows the designation number of the circuit pack installed in the specified slot.
Node Name	Enter the switch node name assigned on the Node Names form. In this example, enter **switchhost**. The same node name cannot be assigned to two different IP interfaces.
Subnet Mask	Identifies which portion of an IP address is a network address and which is a host identifier. Use the default entry, or check with the LAN administrator on site if connecting through the customer LAN.

Field	Definition
Gateway Address	Enter the address of a network node that will serve as the default gateway for the IP interface. If the application goes to points off the subnet, the gateway address of the router is required. If the switch and CMS computer are on the same subnet, a gateway is not required. If using ethernet only, and a gateway address is administered, no IP routes are required.
Net Rgn	For a C-LAN IP interface, use **1**.
VLAN	Enter **y** if this is on a virtual LAN or **n** for a standard LAN.
Number of CLAN Sockets Before Warning	Enter the number of CLAN sockets available before the system issues a warning.
Auto	Enter **y** for auto-negotiation or **n** for manual speed and duplex settings.
Speed	Enter either **10Mbps** or **100Mbps**.
Duplex	Enter either **full** or **half**.

Adding an ethernet data module

Use the Data Module form to assign the Ethernet port of the C-LAN circuit pack.

```
add data-module 2000                                          Page   1 of   1
                              DATA MODULE

  Data Extension: 2000             Name: ethernet data module
            Type: ethernet
            Port: 01A0317
            Link: 8




Network uses 1’s for Broadcast Address? y
```

Field	Definition
Data Extension	Enter an unassigned extension number.
Type	Enter **ethernet**.
Port	Enter the equipment location of the C-LAN circuit pack (TN799). For the ethernet link, always use circuit 17 (for example, **01A0317**).
Link	Enter a TCP/IP link number (1-25 for csi/si, 1-33 for r). This entry is also used on the Processor Channel form.
Name	Enter a name for the data module. This name will display when you list the assigned data modules.
Network uses 1’s for Broadcast Address	This sets the host portion of the IP address to 0s or 1s. The default is yes (all 1s). Use the default if the private network contains only Avaya switches and adjuncts. Enter n only if the network includes non-Avaya switches that use the 0s method of forming broadcast addresses.

Adding the processor interface channels

Use the Processor Channel form to assign the processor channel attributes. With the High Availability option, you will assign two separate processor channels.

```
change communication-interface processor-channels              Page  1 of  X
                      PROCESSOR CHANNEL ASSIGNMENT
Proc                 Gtwy      Interface         Destination      Session     Mach
Chan Enable   Appl.   To  Mode Link/Chan       Node       Port  Local/Remote   ID
  1:   y      mis          s    8   5001  cmshost         0       1     1
  2:   y      mis          s    9   5001  cmshost2        0       2     2
  3:   n                                                 0
  4:   n                                                 0
  5:   n                                                 0
  6:   n                                                 0
  7:   n                                                 0
  8:   n                                                 0
  9:   n                                                 0
 10:   n                                                 0
 11:   n                                                 0
 12:   n                                                 0
 13:   n                                                 0
 14:   n                                                 0
 15:   n                                                 0
 16:   n                                                 0
```

Field	Definition
Proc Chan	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 1 on G3r or DEFINITY Server R, and channel 10 on G3csi, DEFINITY Server CSI, G3si, or DEFINITY Server SI.
Enable	Enter **y**.
Appl	Enter **mis**.
Gtwy To	Leave blank for the local CMS-to-switch link.
Mode	Enter **s** for server.
Interface Link	Enter the TCP/IP link number used on the ethernet data module form.
Interface Chan	Enter the TCP channel number (5000-64500). The default for CMS is 5001 and is defined during CMS setup. See your CMS software installation document for more information.
Destination Node	Enter the node name of the CMS computer as assigned on the Node Names form. In these examples, `cmshost` is used.
Destination Port	Use the default of **0**.

Field	Definition
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the local and remote port to **10**.
Mach ID	Not used for CMS.

Adding IP routing

Use the IP Routing form to set up the IP routes from the switch to the CMS computer. This is required when:

- The switch and the CMS computer are on different subnets, or
- When a Gateway Address is not administered for the C-LAN IP interface.

The following example shows an IP route. This route shows how you get from a gateway (for example, a router) to a network.

```
add ip-route 1                                          Page   1 of   1
                              IP ROUTING

     Route Number: 1
 Destination Node: 3net
     Network Bits: 24  Subnet Mask: 255.255.0  .0
          Gateway: gateway2
            Board: 01C02
           Metric: 0
       Route Type: Network
```

Field	Definition
Route Number	If you are going through a router, you must set up IP route 1 from the switch to the router and set up IP route 2 from the switch to the CMS computer. The example above shows a simple IP route.
Destination Node	This field represents the node name of the destination for this route. You would typically enter the node name for the CMS computer or a router, depending on your configuration.
Network Bits (R1.1 and later)	Enter a value from 0-30.
Subnet Mask (R1.1 and later)	Enter a subnet mask.

Field	Definition
Gateway	Enter the node name of the gateway by which the destination node is reached for this route. This is either the local C-LAN port of the first intermediate node between the C-LAN port and the final destination. For example, if there were one or more routers between the C-LAN port and the final destination node (the CMS computer), the gateway would be the node name of the first router.
C-LAN Board	Enter the equipment location of the C-LAN circuit pack that provides this route. It is possible to have more than one C-LAN circuit pack, but most configurations will only have one C-LAN.
Metric	Specifies the complexity of this IP route. Enter **0** if there are no intermediate nodes between the C-LAN port and the ethernet port on the CMS computer. A metric value of **1** is used only on a switch that has more than one C-LAN circuit pack installed. See *Administration for Network Connectivity* for more information about using this field.

Administering a processor ethernet port connection

Use the procedures in this section to administer a TCP/IP connection over a LAN when connected to a processor ethernet port. If the processor ethernet port is not enabled, you must apply a new license file to the switch.

```
display system-parameters customer-options                    Page   5 of  11
                              OPTIONAL FEATURES

                 Multinational Locations? n            Station and Trunk MSP? n
 Multiple Level Precedence & Preemption? n      Station as Virtual Extension? n
                      Multiple Locations? n
                                                System Management Data Transfer? n
          Personal Station Access (PSA)? n              Tenant Partitioning? n
                        Posted Messages? y       Terminal Trans. Init. (TTI)? n
                        PNC Duplication? n              Time of Day Routing? n
                   Port Network Support? n             Uniform Dialing Plan? y
                                              Usage Allocation Enhancements? y
                Processor and System MSP? n       TN2501 VAL Maximum Capacity? y
                      Private Networking? y
                      Processor Ethernet? y               Wideband Switching? n
                                                                  Wireless? n
                           Remote Office? n
          Restrict Call Forward Off Net? y
                  Secondary Data Module? y


        (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
Processor Ethernet	Verify that the processor ethernet port is enabled.

Displaying the processor ethernet port

Use the IP Interfaces form to display the IP address to the processor ethernet port. Use this form to verify that the IP interface has been administered.

CAUTION:
In most cases, the IP interface is already administered. Do not change the administration. Changing the administration could cause failure with IP telephones and other adjunct links.

```
display ip-interface procr

IP INTERFACES


                  Type: PROCR


             Node Name: procr
            IP Address: 192.9  .22 .245
           Subnet Mask: 255.255.255.0

  Enable Ethernet Port? y
        Network Region: 1
```

Adding node names and IP addresses

Use the Node Names form to assign the name and IP address of the CMS computer and any gateways that are networked with the CMS computer. With the High Availability option, you will assign two CMS computer node names.

```
change node-names ip                                          Page   1 of   1
                                  IP NODE NAMES
    Name                 IP Address           Name                IP Address
3net                  192.168.3  .0                               .   .   .
cmshost               192.168.1  .90                              .   .   .
cmshost2              192.168.3  .90                              .   .   .
default               0  .0  .0  .0                              .   .   .
gateway               192.168.1  .211                             .   .   .
gateway2              192.168.4  .211                             .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
                         .   .   .                                .   .   .
( 8  of  8 administered node-names were displayed )
Use ‘list node-names’ command to see all the administered node-names
Use ‘change node-names ip xxx’ to change a node-name ‘xxx’ or add a node-name
```

Field	Definition
Name	Enter the host name of the CMS computer and any gateway hosts used in the network. The processor ethernet port can be displayed on this form, but cannot be changed. The node names can be entered in any order. The names are displayed in alphabetical order the next time the form is displayed. The `default` node name entry is display-only and is not used for this application. For consistency, use the CMS computer host name as defined during the CMS Setup procedure. See your CMS software installation document for more information. These names are also used in the IP interfaces, data module, IP routing, and other forms. If you change the node name in this form, it is automatically updated on the other forms. **Note:** Do not use special characters in the node name. Special characters are not allowed in the **`/etc/hosts`** file on the CMS computer.
IP Address	Enter the IP address of the CMS computer and any required gateways. **CAUTION:** Plan out the network before you assign any IP addresses. Any future changes that require a change to IP addresses will cause a service disruption.

Adding the processor interface channels

Use the Processor Channel form to assign the processor channel attributes. With the High Availability option, you will assign two separate processor channels.

```
change communication-interface processor-channels              Page  1 of  X
                      PROCESSOR CHANNEL ASSIGNMENT
Proc                 Gtwy      Interface         Destination      Session     Mach
Chan Enable   Appl.   To  Mode Link/Chan       Node       Port  Local/Remote   ID
  1:   y      mis          s    p   5001  cmshost         0       1     1
  2:   n                                                  0
  3:   n                                                  0
  4:   n                                                  0
  5:   n                                                  0
  6:   n                                                  0
  7:   n                                                  0
  8:   n                                                  0
  9:   n                                                  0
 10:   n                                                  0
 11:   n                                                  0
 12:   n                                                  0
 13:   n                                                  0
 14:   n                                                  0
 15:   n                                                  0
 16:   n                                                  0
```

Field	Definition
Proc Chan	Select a processor channel for this link.
Enable	Enter **y**.
Appl	Enter **mis**.
Gtwy To	Leave blank for the local CMS-to-switch link.
Mode	Enter **s** for server.
Interface Link	Enter **p** for the processor ethernet port.
Interface Chan	Enter the TCP channel number (5000-64500). The default for CMS is 5001 and is defined during CMS setup. See your CMS software installation document for more information.
Destination Node	Enter the node name of the CMS computer as assigned on the Node Names form. In these examples, `cmshost` is used.
Destination Port	Use the default of **0**.

Field	Definition
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the local and remote port to **10**.
Mach ID	Not used for CMS.

Administering a Survivable Backup CMS

Use the Survivable Processor form to associate a survivable backup CMS for either:

- a CLAN port on a specific ESS server,
- or a processor ethernet port on a specific ESS or LSP server

The Survivable Processor form is administered on the main server. The translations are sent to the ESS server or LSP during a file sync. After the file sync, the information on Page 2 is used by the LSP or the ESS server to connect to the CMS.

Note:
For more information about the Survivable CMS offer, contact Avaya Professional Services.

On Page 1 of the form, everything but the Network Region is prepopulated based on what was already administered on the Node Name form and the System Parameters ESS form.

```
add survivable-processor ESS1                                    Page   1 of   4
                    SURVIVABLE PROCESSOR - PROCESSOR ETHERNET

                              Node Name: ESS1
                             IP Address: 192.0.9.0
                                     ID: 30
                                   Type: LSP


                          Network Region: 1
```

Field	Definition
Network Region	Enter the network region in which the LSP or ESS server resides.

Use Page 2 of the Survivable Processor form to administer the CMS that is connected to a CLAN or processor ethernet interface.

```
add survivable-processor ESS1                                    Page  2 of  4
                  SURVIVABLE PROCESSOR - PROCESSOR CHANNELS

Proc                          Interface        Destination        Session
Chan Enable   Appl.      Mode Link/Chan      Node         Port  Local/Remote
  1:   y      mis         s    p   5001   cmshost         0       7     7
  2:   n                                                 0
  3:   n                                                 0
  4:   n                                                 0
  5:   n                                                 0
  6:   n                                                 0
  7:   n                                                 0
  8:   n                                                 0
  9:   n                                                 0
 10:   n                                                 0
 11:   n                                                 0
 12:   n                                                 0
 13:   n                                                 0
 14:   n                                                 0
 15:   n                                                 0
 16:   n                                                 0
```

Field	Definition
Proc Chan	Displays the processor channel for this link.
Enable	Enter one of the following values in this field: ● Enter **n** if this processor channel is disabled on the LSP or the ESS server. ● Enter **i** (inherit) if this link is to be inherited by the LSP or ESS server. Generally, you would use the inherit option in the following cases: – The main server connects to the adjuncts using a CLAN and you want the ESS server to use the same connectivity. – The main server connects to the adjuncts using the main server's PE interface and you want the LSP or ESS server to connect to the adjunct using it's PE interface. ● Enter an **o** (override) to override the processor channel information sent in the file sync from the main server. The override option causes the near-end (server's end of the link) address of the link to change to a **p** when the translations are sent from the main server to the LSP or the ESS server. Generally, you would want the override option when an adjunct connects to the main server using a CLAN and you want the adjunct to connect to the LSP or the ESS server's processor ethernet interface. When you enter an **o** in the enable field, you can enter the processor channel information for the LSP or the ESS server in the remaining fields.
Appl	Displays **mis**.

Field	Definition
Mode	Enter **s** for server.
Interface Link	Enter **p** in this field when the physical link is the processor ethernet interface on an LSP or ESS. Enter the CLAN link number when the physical link is a CLAN on an ESS.
Interface Chan	Enter the TCP channel number (5000-64500). The default for CMS is 5001 and is defined during CMS setup. See your CMS software installation document for more information.
Destination Node	Enter the node name of the CMS computer as assigned on the Node Names form. In these examples, `cmshost` is used.
Destination Port	Use the default of **0**.
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the local and remote port to **10**.

Troubleshooting TCP/IP switch connections

TCP/IP link troubleshooting can be done at the switch and at the CMS computer. This section describes tests you can run from either system.

The information in this section includes:

Switch administration

Check all switch administration. See the following sections:

- Administering a TCP/IP switch link on page 41
- Verifying the software version on page 48
- Setting the adjunct CMS release (Communication Manager 3.0 and earlier) on page 50
- Setting the reporting adjunct release (Communication Manager 3.1 and later) on page 51.

With Communication Manager 3.1, you have the option to set the CMS adjunct release to either R13 or R13.1. R13 features are compatible with Communication Manager 3.0 and R13.1 features are compatible with Communication Manager 3.1.

When selecting the CMS adjunct release, make sure that the features you want to use are compatible with the Communication Manager and Call Center Release. For example, if you want to use features specific to Communication Manager 5.0, the Reporting Adjunct Release on the switch should be set to R15, the ACD on the CMS must be administered as Communication Manager 5.0, and the CMS installed must be r15.0xx.x or R15.0auxxx.x.

Switch tests

Using the system administration terminal on the switch, you can use the following commands to test the TCP/IP link:

`ping ip-address X.X.X.X board CCs [packet-length YYYY repeat ZZZ]`

(where ***X.X.X.X*** is the IP address of the CMS computer, ***CCs*** is the equipment location of the C-LAN circuit pack, ***YYYY*** is the size of the test packet, and ***ZZZ*** is the number of times the test will be repeated)

The packet length and repeat options are available with R8 or later. This command sends a test message to the specified IP address to request a remote echo. The results will be either pass or fail, and will show how long the test took to complete. The packet length defaults to 64 bytes, with a maximum of 1500 bytes.

`ping node-name XXX board CCs [packet-length YYYY repeat ZZZ]`

(where ***XXX*** is the node name of the CMS computer, ***CCs*** is the equipment location of the C-LAN circuit pack, ***YYYY*** is the size of the test packet, and ***ZZZ*** is the number of times the test will be repeated)

The packet length and repeat options are available with R8 or later. This command sends a test message to the specified node name to request a remote echo. The results will be either pass or fail, and will show how long the test took to complete. The packet length defaults to 64 bytes, with a maximum of 1500 bytes.

`netstat ip-route`

This command displays the destination IP address, gateway IP address, C-LAN circuit pack used for the route, and the interface for the route.

`status processor-channels X`

(where ***X*** is the processor channel used for the TCP/IP link)

This command displays the current status of the processor channel used for the TCP/IP link, and the last time and reason that the channel went down.

`status link X`

(where ***X*** is the TCP/IP link number)

This command displays the status for the TCP/IP link. Page 1 of the test shows whether the link is connected and is in service. Page 3 of the test shows whether the link is up or down. If the link is not up, there is a problem in translations or connectivity.

`status data-module XXXX`

(where ***XXXX*** is the extension number of the ethernet data module)

This command displays the status for the ethernet data module. This shows which port is connected and if the port is in service.

status sys-link *CCsc*

(where ***CCsc*** is the cabinet, carrier, slot, and circuit of the system link in question)

This command displays the status data for a specific system link. Each system link can be listed using the **list sys-link** command. The status includes the type and operational state of the link, the associated processor channel (if any), active alarms and path status, and a list of all hardware components that make up the link path.

status packet

This command displays the packet interface status.

trace-route [ip-address *X.X.X.X*] [node-name nodename] board *CCs*

(where ***X.X.X.X*** is the IP address of the CMS computer, ***nodename*** is the node name of the CMS computer, and ***CCs*** is the cabinet, carrier, and slot number of the C-LAN circuit pack)

This command works for R8 or later using the TN799B C-LAN circuit pack. This command displays the hops traversed from source to destination, along with the IP addresses of the hop points and final destination, and the observed round-trip delay from the source to each hop point. If no reply is received from a hop point, the IP address is blank.

list measurements clan ethernet *CCsc*

(where ***CCsc*** is the cabinet, carrier, slot, and circuit number of the ethernet port on the C-LAN circuit pack)

This command works for R8 or later. This command displays Cyclic Redundancy Check and collision counts for the past 24 hours in 15-minute intervals. N/A is displayed if the data cannot be retrieved for any interval.

Additional references

See the switch maintenance documents for more details on these test commands.

CMS computer tests

Using the system console on the CMS computer, you can use the following commands to test the TCP/IP link. More information about the UNIX commands can be found by printing out the manual pages (**man *command***).

netstat

This command displays general network status information.

ping *X.X.X.X*

(where ***X.X.X.X*** is the IP address of the switch)

This command sends a test message to the specified IP address to request a remote echo. The results will be either alive or no answer.

ping *XXX*

(where ***XXX*** is the node name of the switch)

This command sends a test message to the specified node name to request a remote echo. The results will be alive, no answer, or unknown host.

traceroute *X.X.X.X*

(where ***X.X.X.X*** is the IP address of the switch)

This command traces the route that an IP packet follows from the CMS computer to the switch. There are more options to the command other than the IP address. Check the manual page for **traceroute** for more options.

snoop

This command allows you to capture and inspect network packets.

spray *hostname*

(where ***hostname*** is the name of the switch)

This command sends a stream of packets to a selected host, and reports how many were received and the transfer rate.

Maintenance > Connection Status (from CMS Main Menu)

This CMS command displays status information for the switch links.

/usr/sbin/ndd /dev/tcp tcp_smallest_anon_port tcp_largest_anon_port

This command allows you to display the possible range of *talk* ports randomly assigned by the CMS when communicating with the switch. These ports are called ephemeral ports.

You should also check the **/etc/hosts** and **/etc/defaultrouter** files to verify that the IP addresses and host names are accurate.

Glossary

Automatic Call Distribution (ACD)	A switch feature. ACD is software that channels high-volume incoming call traffic to agent groups (splits or skills). Also an agent state where the extension is engaged in an ACD call, with the agent either talking to the caller or the call waiting on hold.
CMS	Call Management System (CMS). A software product used by business customers that have an Avaya telecommunications switch and receive a large volume of telephone calls that are processed through the Automatic Call Distribution (ACD) feature of the switch.
High Speed Serial Interface (HSI)	The HSI controller card is a 4-port serial communications card. Each of the four ports is used for a single physical X.25 link. It is an add-on package that is needed by CMS for multiple ACDs.
Split	A group of extensions that receive special-purpose calls in an efficient, cost-effective manner. Normally, calls to a split arrive over one or a few trunk groups.
Switch	A private switch system providing voice-only or voice and data communications services (including access to public and private networks) for a group of terminals within a customer premises.
TSC	Technical Service Center. The Avaya organization that provides technical support for Avaya products.
Transmission Control Protocol/ Internet Protocol (TCP/IP)	A communications protocol that provides interworking between dissimilar systems. It is the de facto standard for UNIX systems.

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