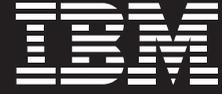
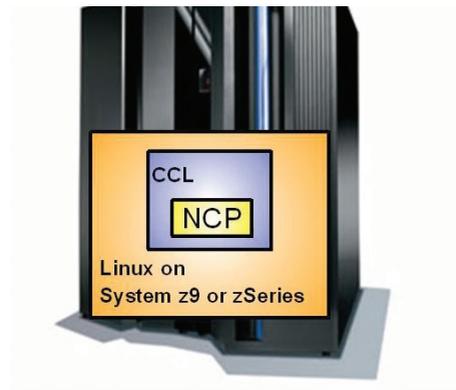


Migrate off of aging hardware while preserving software reliability



IBM Communication Controller for Linux on System z V1.2.1



Highlights

- Provides migration path from IBM 37xx Communication Controller hardware while preserving investment in mission-critical SNA applications.
- Runs reliable NCP software, supporting many key functions including SNI, INN, and boundary function.
- Provides Datalink Switching (DLSw) support, allowing you to move the DLSw function onto the host and enabling another IP path for traffic between NCP and other network resources
- Delivers native LAN support through 3746 TIC3 emulation, helping to enhance performance and simplifying configuration by allowing you to use the 3746 hardware addresses in a CCL environment
- Provides an enablement interface for NPSI X.25 connectivity.
- Provides improved connectivity to VTAM via the OSA-Express2 Open System Adapter for NCP (OSN) support, and improved connectivity between CCLs via IPTG.
- Reduces CPU utilization requirements while increasing throughput.
- Runs on Linux operating system, either in native LPAR mode or in a z/VM LPAR on reliable System z hardware.
- Focuses on ease of migration, running existing NCP code with minimal network definition updates.
- Preserves strategic business-to-business connections, with no dependency on coordinated network updates by business partners.

Companies are simplifying their networks and moving toward an on demand environment. They want to move off of older, slower networking hardware and be able to take advantage of newer technology. At the same time, they want to preserve their investment in their current application portfolio and continue to use solutions they have come to rely on. IBM's Communication Controller for Linux™ on System z™ is software that emulates IBM 3745 hardware and runs in the mainframe. Communication Controller for Linux (CCL) provides an attractive migration solution, integrating the latest networking hardware with mission-critical existing software.

New for V1.2.1

This release of IBM's Communication Controller for Linux on System z adds functions which make it an even more viable IBM 37xx replacement option. Support for data link switching (DLSw), as described by RFCs 1795 and 2166, helps facilitate network simplification by allowing customers to move the DLSw function into the host, providing an alternative to data center DLSw routers. This new DLSw support provides another IP path for SNA traffic between

NCP and other network resources. Native LAN support provides performance and configuration enhancements through 3746 TIC3 emulation. These enhancements move the Logical LinkControl (LLC) function from NCP to CCL, helping to improve the performance of internal processing and enhancing usability by simplifying migration, allowing you to use the 3746 hardware addresses in a CCL environment. IP transmission group (IPTG) usability enhancements allow dynamic changes to definitions, and user control of which physical connection is used.

Alternative Hardware Option

The IBM 37xx Communication Controller hardware family was withdrawn from marketing in 2002. The IBM Communication Controller for Linux on System z (CCL) was developed as a migration path from this hardware. CCL enables the Network Control Program (NCP) software that runs on IBM 37xx hardware to now run in Linux on System z hardware. The result is replacement of dependencies on older 37xx hardware with newer System z hardware and Linux software. And the mainframe Linux platform is a strategic environment for running many key software solutions along with CCL.

In the past, IBM 37xx NCPs were connected to your host via token-ring or ESCON channel attachments. Many token-ring products are also

being withdrawn from marketing and ESCON channel chips are no longer manufactured. In addition to moving the NCP into flexible System z Linux servers, running your NCP in Communication Controller for Linux also provides an alternative Ethernet connection into the host, removing another non-strategic hardware dependency.

Network Consolidation

Communication Controller for Linux on System z supports consolidation of many of your SNA network components into the mainframe where VTAM® and the mainframe SNA applications reside. At the same time, it supports consolidation of your network infrastructure to IP. Most traffic enters and leaves CCL as SNA network flows over an OSA adapter. However, your wide area network infrastructure does not need to be SNA. You can consolidate your traffic and use tunneling such as data link switching (DLSw) to encapsulate the SNA communication over an IP network or x.25 over TCP/IP (XOT) to send x.25 traffic over IP. And using the CCL IPTG function, SNA flows between CCL NCPs can go over IP, all the way into the mainframe. Bringing NCP into the mainframe and consolidating your network infrastructure to IP can decrease complexity and skill requirements throughout the network. At the same time, CCL allows you to continue using the applications you

count on today without requiring a rewrite to IP, simplifying migration and ensuring continued reliability.

Connectivity Options

The main difference between running NCP in a IBM 37xx and running it in the mainframe is in the area of network connectivity. Connectivity to Communication Controller on System z is through OSA adapters. In V1R1, connectivity from CCL to the network and VTAM required a copper OSA port running in LCS mode. In V1R2, layer 2 support has been added for connectivity from CCL. This uses QDIO mode and lets you use any OSA Express adapter including fiber. OSA with layer 2 support has the added advantage of supporting virtual MAC addresses, so that one physical port may be associated with multiple addresses and appear as many ports to the network.

Connectivity from VTAM to CCL may still be through a second OSA port running in LSA mode, as was required in CCL V1R1. Or, for V1R2, the connectivity between VTAM and CCL may use channel datalink control (CDLC) which has been added through the OSA in NCP mode (OSN) feature available on the System z9.

Connectivity between two CCL NCPs may also take advantage of the V1R2 IPTG function. This allows the SNA traffic between the CCL NCPs to flow

over an IP network all the way into the mainframe.

The CCL LAN connectivity through OSA may be either token ring or Ethernet. From an NCP perspective, NCP only supports SNA traffic over token ring LAN connections, so if Ethernet is used, CCL maps the Ethernet frames to token ring before sending them to NCP. IBM's 37xx hardware supports a variety of other non-LAN connectivity types, including x.25, SDLC, and frame relay. In order to migrate these connections from the older hardware to CCL, you have to terminate them at a WAN aggregation layer router and map them to the CCL NCP's LAN connection.

Ease of Migration

Because CCL was developed as a migration solution, simplifying migration was a key focus area. Existing NCP software, with no required code changes, runs in Linux on System z. Some NCP definition updates might be needed, for example adding a token-ring line definition if you do not already have one. CCL preserves your SNA subarea network topology and does not require APPN. Coordinated changes on the part of business partners are also not required. An NCP running in CCL can connect to another CCL NCP or to an NCP running in IBM 37xx, so migration can be staged. And CCL provides interfaces to load,

operate, manage, and dump NCPs in a manner similar to operating NCP on an IBM 37xx.

If using NPSI, mainframe NPSI application and NPSI setup is as usual. And NCP management tools such as NTuneMON and Network Performance Monitor (NPM) continue to be supported.

NCP Functionality

Many key NCP functions now run in the Linux on System z platform using Communication Controller for Linux. SNA Network Interconnectivity (SNI) for business-to-business communication across networks is supported. As previously stated, migration on the part of the attached business partner is not required. Intermediate Network Node (INN) for communication between subareas within the same network is also supported.

In addition, selected boundary functions for Boundary Network Node (BNN) traffic are supported providing connectivity to SNA peripheral nodes. Continuing to connect these resources through NCP preserves the network topology. NCP boundary function support includes multiple availability functions. SSCP Takeover and Giveback and Extended Recovery Facility (XRF) will work as they do today. Redundant CCLs and NCPs can be defined using duplicate MAC addresses for load balancing and

availability of NCPs and OSA ports. Functionality similar to IBM 3745 twin CCU configurations is available and CCL could also provide an alternative disaster recovery solution in place of a redundant 37xx installation.

NPSI support via the use of an x.25 over TCP/IP (XOT) product is provided. NPSI running on CCL will continue to have the same x.25 capabilities. XOT will be used to transport the x.25 traffic. Since the x.25 traffic will need to come into the mainframe over an OSA port, the XOT endpoint has to be inside the box. CCL provides an open interface to enable vendors to provide this mainframe XOT function.

CCL Components

The IBM Communication Controller for Linux on System z consists of three components, the Engine, the Network Device Handler, and the MOSS console. The CCL Engine allows NCP to run unchanged in Linux on System z. Each instance of the CCL Engine loads one NCP. Multiple CCL Engines can run in one Linux image. The Network Device Handler (NDH) provides the interface from the Linux device driver to the CCL Engine. If applicable, the NDH bridges the Ethernet frames to token-ring. The CCL MOSS console is a browser interface that provides functions similar to the IBM 37xx MOSS console.



Linux on System z Advantages

Not only does CCL reduce your dependency on aging hardware, running NCP in Linux on mainframe servers provides many other advantages. You can leverage the strengths of System z hardware, known for its reliability, security, scalability and business resiliency.

You can run Communication Controller for Linux on System z with Linux running in either native LPAR mode or as a z/VM guest. You can also use IBM's Integrated Facility for Linux (IFL). Communication Controller for Linux on System z is an attractive migration alternative integrating the advantages of System z hardware, virtual servers, and the Linux operating system with the reliability of your existing NCP software and SNA applications.

For More Information

To learn more about the IBM Communication Controller for Linux on System z V1.2.1, visit:
ibm.com/software/network/ccl

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IBM Communication Controller for Linux on System z at a glance

Component or related application:	Features:
NCP Support	<ul style="list-style-type: none">• Runs existing NCP code• Supported NCP functions:<ul style="list-style-type: none">• SNI• INN• BNN• XRF• NRF• SSCP Takeover and Giveback• Duplicate MACs• Load and dump over CDLC connections• Native LAN emulation allowing use of 3746 TIC3 addresses
NPSI Support	<ul style="list-style-type: none">• Support of X.25 Over TCP/IP (XOT) interface
DLSw Support	<ul style="list-style-type: none">• Support for data link switching (DLSw) as described by RFCs 1795 and 2166
Installation, Configuration, and Administrative Options	<ul style="list-style-type: none">• Installation via CCL InstallShield• Can be automatically started during Linux boot• NCP load module is Linux file• VTAM operator commands and CCL MOSS console operation both supported
Problem Determination and Systems Management	<ul style="list-style-type: none">• Diagnostic traces of data flows to/from NCP, CCL components, VTAM, network• Support of NCP dumping and restarting functions with faster availability• CCL Engine dumps available• Continue use of network management products such as Tivoli® NetView® and NTuneMON

Requirements:	Features:
<p>Hardware</p>	<ul style="list-style-type: none"> • CCL runs on the following IBM servers, or equivalent: <ul style="list-style-type: none"> • IBM System z • IBM eServer zSeries z800, z890, z900, and z990 • IBM S/390 Parallel Enterprise Servers - Generation 5 (G5) and Generation 6 (G6) models <p>Additional hardware requirements for the different connectivity options (Note: VTAM needs to connect to Communication Controller for Linux NCP over a LAN or CDLC connection):</p> <ul style="list-style-type: none"> • CDLC requires Open Systems Adapter for NCP (OSN) support <ul style="list-style-type: none"> - System z9 server with associated system software: <ul style="list-style-type: none"> - z/OS V1.4, or higher, with APARs OA11238 and OA07875 (for OSN CHPID support in IOS and HCD) - If running CCL on a Linux guest under VM, z/VM V5.1, or higher, with APAR VM63722 for OSN CHPID support - OSA-Express2 features with OSN support: <ul style="list-style-type: none"> - 3364 OSA-Express2 LX Gigabit Ethernet - 3365 OSA-Express2 SX Gigabit Ethernet - 3366 OSA-Express2 1000Base-T Ethernet • LAN <ul style="list-style-type: none"> - LAN over Layer 2 <ul style="list-style-type: none"> - IBM System z 990 or 890 or later server with associated system software. If running CCL on a Linux guest under VM, you need z/VM V5.1 with Layer 2 support in PTF for APAR VM63538. Refer to the 2084/2086 PSP buckets for any additional required service

Requirements:	Features:																				
<p>Hardware</p>	<ul style="list-style-type: none"> - OSA Express features with layer 2 routing support: <ul style="list-style-type: none"> - 1364 OSA-Express LX Gigabit Ethernet - 1365 OSA-Express SX Gigabit Ethernet - 1366 OSA-Express 1000Base-T Ethernet - 2364 OSA-Express LX Gigabit Ethernet - 2365 OSA-Express SX Gigabit Ethernet - 2366 OSA-Express Fast Ethernet - 3364 OSA-Express2 LX Gigabit Ethernet - 3365 OSA-Express2 SX Gigabit Ethernet - 3366 OSA-Express2 1000Base-T Ethernet - 3368 OSA-Express2 10 Gigabit Ethernet - LAN over LCS Ethernet or token ring - OSA copper LAN port(s) in LCS mode (OSA-2 or OSA-Express (at least MCL level 3.50 for z900 and z800, and 5.50 for z990 and z890)) <table border="1" data-bbox="1020 1374 1649 2001"> <thead> <tr> <th>Required Processor</th> <th>Feature code</th> <th>Ethernet</th> <th>Feature code</th> <th>Token-Ring card</th> </tr> </thead> <tbody> <tr> <td>G5/G6</td> <td>2340</td> <td>OSA-Express Fast Ethernet</td> <td>5201</td> <td>OSA2 ENTR</td> </tr> <tr> <td>z800 z900</td> <td>2366</td> <td>OSA-Express Fast Ethernet</td> <td>2367</td> <td>OSA-Express</td> </tr> <tr> <td>z890 z990</td> <td>1366</td> <td>OSA-Express (upgraded) 1000BaseT</td> <td>2367</td> <td>OSA-Express</td> </tr> </tbody> </table>	Required Processor	Feature code	Ethernet	Feature code	Token-Ring card	G5/G6	2340	OSA-Express Fast Ethernet	5201	OSA2 ENTR	z800 z900	2366	OSA-Express Fast Ethernet	2367	OSA-Express	z890 z990	1366	OSA-Express (upgraded) 1000BaseT	2367	OSA-Express
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Requirements:	Features:
Hardware	<ul style="list-style-type: none">- OSA/SF to configure the OSA LAN connectivity, if applicable- Note: In addition to the above requirements for CCL, LAN connectivity between VTAM and a CCL NCP requires at least one LSA (copper) OSA port for the VTAM end of the LAN connection.• DLSw<ul style="list-style-type: none">- One or more DLSw capable routers, and a TCP/IP connection to each• X.25<ul style="list-style-type: none">- One or more XOT capable router(s), and a TCP/IP connection to each• IPTG<ul style="list-style-type: none">- TCP/IP connection to each partner Communication Controller for Linux

Software

- NCP V7R5 or later, and an environment (z/VM, VSE, z/OS) to generate NCP load modules
- ACF/SSP V4R5, and later (5655-041, 5654-009, 5686-064)
- If X.25 support is used:
 - NPSI V3R8, or later (the release that corresponds to your NCP release)
 - XOT server software, provided by an ISV, to run in the Linux system with CCL
- One of the following Linux on System z distributions with recent maintenance:
 - SUSE Linux Enterprise Server 8 (31-bit and 64-bit) for IBM System z and IBM S/390 (SLES8) + Service Pack 4 (SP4)
 - SUSE Linux Enterprise Server 9 (31-bit and 64-bit) for IBM System z and IBM S/390 (SLES9) + Service Pack 2 (SP2)
 - Red Hat Enterprise Linux V4 (31-bit and 64-bit) (RHEL4) + Update 1 (U1)
- CCL connections via CDLC and Layer 2 require more recent kernel 2.6-based Linux distributions:
 - SUSE Linux Enterprise Server 9 (31-bit and 64-bit) for IBM System z and IBM S/390 (SLES9) + Service Pack 3 (SP3)
 - Red Hat Enterprise Linux V4 (31-bit and 64-bit) (RHEL4) + Update 3 (U3)

For the latest information about Linux requirements, visit the Communication Controller for Linux Web site:

- <http://www.ibm.com/software/network/ccl>

In order to support Communication Controller for Linux on System z, when not using CDLC, VTAM must support activation of CCL NCPs that are LAN attached to the activating VTAM through an XCA major node. The following VTAM APARs provide this function:

- z/VM/VTAM V4R2 - APAR VM63677
- VSE/VTAM V4R2 - APAR DY46311
- OS/390 Communications Server V2R10 - APAR OA10425
- z/OS Communications Server V1R2, V1R4, V1R5, and V1R6 - APAR OA10425

Memory and Storage

- 65 MB DASD for Communication Controller for Linux on System z and Java code
- 80 MB to 100 MB DASD per Communication Controller for Linux on System z instance for traces, dumps, logs, and NCP load modules
- 20 MB RAM per Communication Controller for Linux on System z instance

Note: Additional DASD and memory is required for the base Linux operating system, and for other Linux packages (RPMs) that must be present on the system for CCL to function properly. For example, on some Linux distributions, the Linux Kernel Source package is required for installation of the Network Device Handler (NDH), and that package can take 300 MB of DASD. Refer to the CCL README for the complete list of required packages.