



Communication Controller for Linux on zSeries

# CDLC - Channel Connectivity for z9 Processor

Sample Definitions for Communications  
Controller for Linux z/Series

## Target Audience

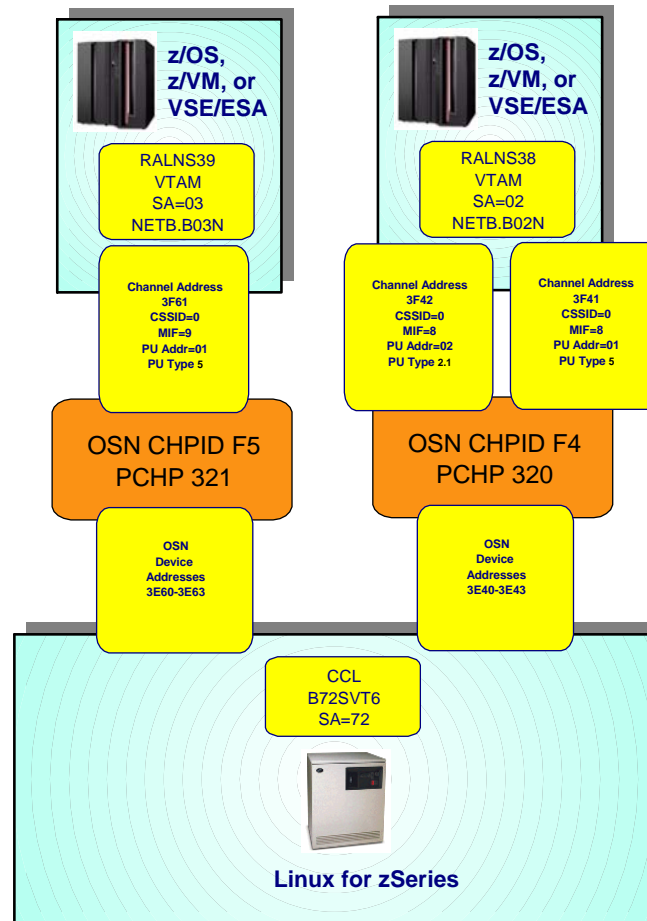
- Customers who use the new z9 Processor and want to make use of 3745 channel operations to control Communications Controller for Linux on z/Series

## Purpose of this Paper

The intent of this paper is to provide a tested solution for customers during the migration from 3745/3746-900 FEPs to Communication Controller for Linux z/Series (CCL). This document will provide working examples of the following:

- Sample IOCDs definitions
- NCP Channel definitions
- Installing the OSN devices on the Linux Host
- Flat file definitions for IPL Port
  - for loading Communications Controller for Linux on z/Series
- Channel Major Nodes
  - Type 5 and Type 2.1
- Supported Operator Commands

# Test Configuration



## Resources Used for Solution Verification

- Two z/OS Communications Servers
- One Linux ID running as guest under z/VM
  - 512mb of memory
  - 3 Virtual CPs
  - 2 3390-3 DASD volumes
- Two QDIO OSA adapters defined as an OSN CHPIDs

## Sample IOCDs Definition

```
RESOURCE PART=((CSS(0),(RANS38,8),(RANS39,9),(RALNS27,D)))
*
CHPID PCHID=320,PATH=(CSS(0,1),F4),TYPE=OSN,SHARED
CHPID PCHID=321,PATH=(CSS(0,1),F5),TYPE=OSN,SHARED
*
CNTLUNIT CUNUMBR=3E40,PATH=((CSS(0),F4),(CSS(1),F4)),UNIT=OSN
CNTLUNIT CUNUMBR=3E60,PATH=((CSS(0),F5),(CSS(1),F5)),UNIT=OSN
*
IODEVICE ADDRESS=(3E40,32),CUNUMBR=3E40,UNIT=OSN,
UNITADD=20
IODEVICE ADDRESS=(3F41,10),CUNUMBR=3E40,UNIT=3745,
UNITADD=01
IODEVICE ADDRESS=(3F4E,1),CUNUMBR=3E40,UNIT=OSAD,
UNITADD=FE
*
IODEVICE ADDRESS=(3E60,32),CUNUMBR=3E60,UNIT=OSN,
UNITADD=20
IODEVICE ADDRESS=(3F61,10),CUNUMBR=3E60,UNIT=3745,
UNITADD=01
IODEVICE ADDRESS=(3F6E,1),CUNUMBR=3E60,UNIT=OSAD,
UNITADD=FE
```

# IOCDs Explained

- RESOURCE PART defines the LPARs associated with each Channel Subsystem
- CHPID defines which CSSs will be allowed to access the device
- The CNTLUNIT defines the unit type, the path for the CHPID and defines the control unit number used in the IODEVICE macro.
- The IODEVICE can be broken down as follows:
  - The UNIT defines either OSN or 3745. OSN defines the device range on the Linux side of the OSN and 3745 defines the VTAM side of the connection.
  - The ADDRESS statement defines the first address in the range then the number of devices in the range
  - The UNITADD is relevant only to the VTAM side of the connection. The value will be used in the NCP gen as ADDR=xx on the logical lines PU statement.
  - The CUNUMBR points to the CUNUMBR on the CNTLUNIT and is used to tie the Linux side of the device to the VTAM side.

## Linux Commands to Setup OSN Device

- Create file `hwcfg-qeth-bus-ccw-0.0.3e60` in `/etc/sysconfig/hardware`

```
#-----  
# hwcfg-qeth-bus-ccw-0.0.3e60  
#  
# Hardware configuration for a qeth device at 0.0.3e60  
# Automatically generated by netsetup  
#-----
```

```
STARTMODE="auto"  
MODULE="qeth"  
MODULE_OPTIONS=""  
MODULE_UNLOAD="yes"
```

```
# Scripts to be called for the various events.
```

```
SCRIPTUP="hwup-ccw"
```

```
SCRIPTUP_ccw="hwup-ccw"
```

```
SCRIPTUP_ccwgroup="hwup-qeth"
```

```
SCRIPTDOWN="hwdown-ccw"
```

```
# CCW_CHAN_IDS sets the channel IDs for this device
```

```
# The first ID will be used as the group ID
```

```
CCW_CHAN_IDS="0.0.3e60 0.0.3e61 0.0.3e62"
```

```
# CCW_CHAN_NUM set the number of channels for this device
```

```
# Always 3 for an qeth device
```

```
CCW_CHAN_NUM=3
```

```
# CCW_CHAN_MODE sets the port name for an OSA-Express device
```

```
CCW_CHAN_MODE="GIGE3E60"
```

- Similar configurations will need to be made for device addresses `3e20` and `3e40`

## Linux Commands to Setup OSN Device

Create file ifcfg-`geth-bus-ccw-0.0.3e60` in  
`/etc/sysconfig/network`

```
BOOTPROTO="static"
```

```
UNIQUE=" "
```

```
STARTMODE="onboot"
```

- The previous definition will allow the OSN device to become active at startup.



## Other Linux Considerations

- Similar definitions will need to be made for device addresses 3e20 and 3e40
- In order for the new OSN device to be recognized at startup, you must modify the `/etc/sysconfig/hardware/scripts/hwup-ccw` as follows:

Find Line: 1731/01|1731/05

Change to: 1731/01|1731/05|1731/06

## IPL Port Definitions for CDLC

IPLPORTDEFS

```
*
* -----
*      NCP DEFINITION:      ADDRESS=2112, HOSTLINK=9, ADDR=1
*      OSN DEFINITION:      CSS_ID=X'0' MIF_ID=X'09' UNITADD=X'01'
*                           CCID=X'00090001'
*                           DEVICE=X'3E60'
* -----
*
      ADDRESS      2112
      HOSTLINK     9
      ADDR         01
      DEVICE       3e60
```

## B03CA – Channel Attached Major Node

```
B03CA      VBUILD      TYPE=CA
B03GRP     GROUP       LNCTL=NCP
*
*****
*      C3P13E60 PU ADDR = 01: CSS ID = 0: MIF = 9:      *****
*****
*
B03CALN    LINE        ADDRESS=3F61 ,MAXBFRU=36
B03PU      PU          CHANCON=COND ,MAXDATA=32768 ,TGN=1
```

## B02CA – Channel Attached Major Node

```
B02CA      VBUILD      TYPE=CA
B02GRP     GROUP       LNCTL=NCP
*
*****
*      C2P13E40 PU ADDR = 01: CSS ID = 0: MIF = 8:      *****
*****
*
B02CALN    LINE        ADDRESS=3F41 ,MAXBFRU=36
B02PU      PU          CHANCON=COND ,MAXDATA=32768 ,TGN=1
```

## B02LCL – Local SNA Major Node

```
B02LCL  VBUILD TYPE=LOCAL
```

```
*
```

```
*****
```

```
*      C2P23E40 PU ADDR = 02: CSS ID = 0: MIF = 8:          *****
```

```
*****
```

```
*
```

```
B02LCLP1 PU      PUTYPE=2,CUADDR=3F42,ISTATUS=ACTIVE,XID=YES,
                  VPACING=0,SSCPFM=USSSCS,MAXBFRU=255,DYNLU=YES,
                  CONNTYPE=APPN,CPCP=YES
```

```
*
```

```
*
```

# B72SVT6 – CDLC Physical Line Definitions

```

*****
*                               CCL CDLC PHYSICAL LINE 2112                               *
*****
*
B72GRP    GROUP LNCTL=CA,ANS=CONT
*
B72C2112  LINE  ADDRESS=2112,ANS=CONT,SRT=( 32765,32765),                               *
              XMONLNK=YES,SPEED=18000000
B72P2112  PU   PUTYPE=1
*
*****
*   Logical Group for Physical Line 2112                                           *
*****
*
B72CALG1  GROUP LNCTL=CA,PHYSRSC=B72P2112,MAXPU=32,NPACOLL=NO,ANS=CONT, *
              TIMEOUT=180,DELAY=0.0,CASDL=10,SRT=( 32765,32765)
*

```

## B72SVT6 – CDLC Logical Lines to NETB.B03N

```
*****
* CONNECTION TO RALNS39 --- CSS ID = 0: MIF = 9: PUADDR=01
*****
*
B72LL03  LINE  ADDRESS=NONE,HOSTLINK=09,SPEED=18000000,MONLINK=YES
C3P13E60 PU    PUTYPE=5,ADDR=01,TRANSFR=140,TGN=1,MONLINK=YES
*
```

- The last 4 characters of the PU Name (3E60) equates to the READ device address of the OSN CHPID defined for the Linux host
- Since the HOSTLINK and ADDR statements are correct, there is no need to over-ride with the CCLDEFs file.

## B72SVT6 – CDLC Logical Lines to NETB.B02N

```
*****
* CONNECTION TO RALNS38 --- CSS ID = 0: MIF = 8: PUADDR=01
*****
*
B72LL02  LINE  ADDRESS=NONE,HOSTLINK=08,SPEED=18000000,MONLINK=YES
C2P13E40 PU    PUTYPE=5,ADDR=01,TRANSFR=140,TGN=1,MONLINK=YES
C2P23E40 PU    PUTYPE=2,ADDR=02
*
```

- The last 4 characters of the PU Name (3E60) equates to the READ device address of the OSN CHPID defined for the Linux host
- Since the HOSTLINK and ADDR statements are correct, there is no need to over-ride with the CCLDEFs file.



# Other NCP Gen Considerations

- You will need to have corresponding HOST and PCCU definitions i
- TYPEGEN=NCP instead of TYPEGEN=NCP-R in the BUILD macro
- The VERSION keyword on the BUILD macro must have the "F" extension for ODLG lines

# Starting CCL from Linux – No Load Option

- From the Linux console, change to the CCL directory:
  - `cd /opt/ibm/Communication_Controller_for_Linux/`
- Load the CCL kernel module
  - `./load_ndh.sh`
    - You will receive the message :  
NDH kernel modules loaded. You are now able to run the cclengine
- Start the CCL engine
  - `nohup ./cclengine -mB72SVT6 -p2072 SVTB72 &`
    - If you use telnet or ssh into the Linux host you will want to preface the command with “nohup” so that the process will remain active even after the telnet/ssh session is terminated.

# Activating NCP using Channel Commands

## From NETB.B03N, activate the Local Major Node

```
V NET,ACT,ID=B03CA,ALL
IST097I VARY ACCEPTED
IST093I B03CA ACTIVE
IST464I LINK STATION B03PU HAS CONTACTED B72SVT6 SA 72
IST093I B03PU ACTIVE
```

## From NETB.B03N, activate the NCP Major Node

```
V NET,ACT,ID=B72SVT6,ALL
IST097I VARY ACCEPTED
IST093I B72SVT6 ACTIVE
IST093I B72NPPU ACTIVE
IST093I B72P2112 ACTIVE
IST464I LINK STATION C2P13E40 HAS CONTACTED B02N SA 2
IST093I C2P13E40 ACTIVE
IST464I LINK STATION C3P13E60 HAS CONTACTED ISTPUS SA 3
IST093I C3P13E60 ACTIVE
```

## Contacting NCP using Channel Attached Major Node

- **From NETB.B02N activate the Channel major node**

```
V NET,ACT,ID=B02CA,ALL
IST097I VARY ACCEPTED
IST093I B02CA ACTIVE
IST464I LINK STATION B02PU HAS CONTACTED B72SVT6 SA 72
IST093I B02PU ACTIVE
```

## Contacting NCP using Local Major Node

- **From NETB.B02N activate the Local major node**

```
V NET,ACT,ID=B02LCL,ALL
IST097I VARY ACCEPTED
IST093I B02LCL ACTIVE
IST1086I APPN CONNECTION FOR NETB.B03N IS ACTIVE - TGN = 21
IST093I B02LCLP1 ACTIVE
IST1096I CP-CP SESSIONS WITH NETB.B03N ACTIVATED
```

# Starting CCL from Linux – With Load Option

- From the Linux console, change to the CCL directory:
  - `cd /opt/ibm/Communication_Controller_for_Linux/`
- Load the CCL kernel module
  - `./load_ndh.sh`
    - You will receive the message :  
NDH kernel modules loaded. You are now able to run the cclengine
- Start the CCL engine
  - `nohup ./cclengine -mcclcldp -p2072 SVTB72 &`
    - If you use telnet or ssh into the Linux host you will want to preface the command with “nohup” so that the process will remain active even after the telnet/ssh session is terminated.
    - `cclcldp` tells the cclengine the load will come from the VTAM command

# Activating NCP using Channel Commands

## From NETB.B03N, load and activate the NCP Major Node

```
V NET,ACT,ID=B72SVT6,ALL,LOAD=YES,U=3F61
IST097I VARY ACCEPTED
IST461I ACTIVATE FOR U/RNAME ENTRY ID = 3F61-S STARTED
IST897I LOAD OF B72SVT6 STARTED
IST270I LOAD OF B72SVT6 COMPLETE - LOAD MODULE = B72SVT6
IST464I LINK STATION 3F61-S HAS CONTACTED B72SVT6 SA 72
IST093I B72SVT6 ACTIVE IST093I B72NPPU ACTIVE
IST093I B72P2112 ACTIVE
IST464I LINK STATION C2P13E40 HAS CONTACTED B02N SA 2
IST093I C2P13E40 ACTIVE
IST464I LINK STATION C3P13E60 HAS CONTACTED ISTPUS SA 3
IST093I C3P13E60 ACTIVE
```

## Contacting NCP using Channel Attached Major Node

- **From NETB.B02N activate the Channel major node**

```
V NET,ACT,ID=B02CA,ALL
IST097I VARY ACCEPTED
IST093I B02CA ACTIVE
IST464I LINK STATION B02PU HAS CONTACTED B72SVT6 SA 72
IST093I B02PU ACTIVE
```

## Contacting NCP using Local Major Node

- **From NETB.B02N activate the Local major node**

```
V NET,ACT,ID=B02LCL,ALL
IST097I VARY ACCEPTED
IST093I B02LCL ACTIVE
IST1086I APPN CONNECTION FOR NETB.B03N IS ACTIVE - TGN = 21
IST093I B02LCLP1 ACTIVE
IST1096I CP-CP SESSIONS WITH NETB.B03N ACTIVATED
```