Managing I/O Configuration from z/VM

Rick Barlow

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Topics

- What is an I/O Configuration?
- Benefits of Dynamic I/O Configuration
- What is Dynamic I/O Configuration on z/VM
- Elements of Dynamic I/O Configuration
- Preparing for Dynamic I/O
- Dynamically Changing your I/O Configuration
  - z/VM HCD & HCM only
  - z/OS HCD & z/VM HCD
  - Native VM commands
- Conclusions
- Questions?

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What is an I/O Configuration?

- Definition of Resources that are available to the processor complex
  - Resources include:
    - Machine type
    - Logical Channel Subsystems (LCSS)
    - Logical Partitions (LPARs)
    - Channel Paths (CHPIDs)
    - Control Units (CNTLUNIT or CU)
    - Devices (IODEVICE; often referred to as UCB in software)
- Two views
  - Hardware in the Channel Subsystem (CSS)
    - Hardware System Area (HSA)
    - Stored in I/O Configuration Dataset (IOCDS)
  - Software in the Operation System Configuration (OSCONFIG)

Benefits of Dynamic I/O Configuration

- Avoid unnecessary outage to change hardware configuration
  - Add new hardware
  - Remove hardware
  - Change configuration
    - Paths, Switches, etc
- Manage configuration for all LPARs on a Central Processor Complex (CPC)

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What is Dynamic I/O Configuration

- Modify the hardware I/O definitions (IOCDS) without an outage
  - Native VM CP commands
    - Since VM/ESA Version 2 Release 1.0 – GA October 1995
    - Commands based on hardware requirements
    - Add, change, delete CHPID, CNTLUNIT, IODEVICE
    - Modify the software view of I/O definitions
      - *Reset I/O control blocks*
        - *Devices that do not support Sense commands*
        - *Clear control blocks of devices with errors*
  - VM HCD and HCM
    - Since z/VM Version 4 Release 4.0 – GA August 2003

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Comparisons Between Native VM CP Commands and HCD

- Amount of detail required in the Input Output Definition File (IODF)
  - VM CP Commands tightly linked to hardware requirements – **only**
    - z/VM CP manages the software view automatically
      - *Automatic changes controlled by z/VM configuration parameters*
  - HCD requires additional information
    - OSCONFIG (software view)
      - *z/OS HCD requires more than z/VM*

- Interface
  - VM CP Commands - simple line commands resemble IOCP statements
  - HCD
    - z/VM: HCM on workstation for changes; REXX for activation, etc
    - z/OS: either ISPF panels or HCM on workstation

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Comparisons Between Native VM CP Commands and HCD

- ## Restriction
  - VM CP Commands permit *all* changes allowed by hardware
  - HCD imposes restrictions
    - Safeguards in HCD to help avoid mistakes but complicate some valid changes

- ## Risk
  - VM CP Commands require significant understanding of IOCP and the command syntax
    - Easy to make dynamic changes that don't *exactly* match IOCDS
  - HCD helps to prevent mistakes
    - Validation and consistency

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Differences

- VM Configuration
  - Each machine has a unique IOCP source
  - Special devices coded in SYSTEM CONFIG
    - Older devices that don't response to sense command
    - Devices that require additional configuration
      - e.g. Printers
    - Console information
  - Shared devices not identified
  - Special handling such as offline at IPL
- HCD and HCM
  - All machines in a single view
  - Common IODF has hardware and software view for all included CPCs
  - Shared devices identified
  - Additional information
    - Switch information

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Advantages of HCD

- Single point of control
  - Hardware and software definitions both maintained with HCD; Activated using information stored in IODF
- Automatic lock-step approach
  - After successfully performing dynamic changes in the running system, the changes are applied to the prospective IOCDS and written to the Support Element to be available for the next POR
- Automatic backout and recovery capability
  - If an error is encountered anywhere in the process, all changes are backed out.
- Check consistency between hardware and software definitions
  - Guaranteed via unique tokens

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Decision

- Choose how and where to manage I/O configuration
    - z/VM
        - VM Configuration - CP commands and IOCP
        - Knowledgeable users
    - z/VM HCD and HCM
        - New users of z/VM (if no z/OS is present)
        - More controlled
    - Considerations
        - Cannot mix HCD / HCM with native CP commands
        - One-time switch from HCD / HCM to native CP commands is possible
        - Return to HCD / HCM requires POR

    - z/OS HCD is needed for any machine that has z/OS LPARs or guests
        - z/VM can use the IODF generated by z/OS HCD
        - z/OS cannot use the IODF generated by z/VM HCD
            - *Not all UIMs supplied or supported in z/VM HCD*

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Recommendations

- Use HCD and a single IODF if multiple CPCs share resources

- Use z/OS HCD to manage changes to the IODF if z/OS is present in one or more LPARs in the shared configuration
  - z/VM HCD can still activate the configuration
- Use z/VM HCD to manage changes to the IODF if you are new to System z
  - If you don't want to learn the intricacies of IOCP and the z/VM CP Dynamic I/O commands
- Use z/VM CP Commands if:
  - You really want to learn the fine points of System z hardware
  - You have a machine where you have the flexibility to make changes but can make corrections if needed

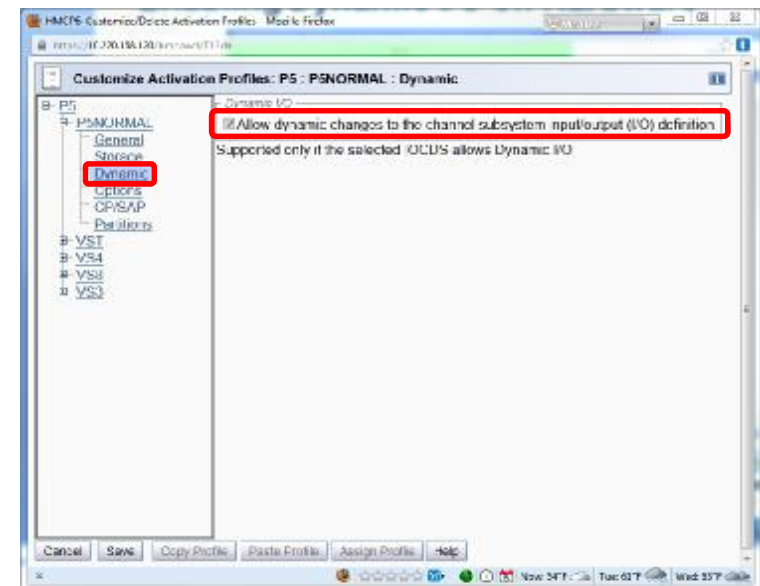# Elements of Dynamic I/O Configuration

- Facilities for Enabling dynamic I/O configuration
  - Hardware
  - Software
- IOCP/IOCDS file
- Hardware and Software Functions and Commands
  - HCD and HCM
  - z/VM CP commands
    - Add/Modify/Delete Definitions
      - *Channel Paths, Control Units, I/O Devices*
    - Select or Change active IOCDS

Elements of Dynamic I/O Configuration

- SYSTEM CONFIG
  - CMS file on the PARM disk
  - Enable Dynamic I/O
  - Specify IODF if using HCD to manage hardware view
    - Include OSCONFIG if using HCD to manage software view
  - If not using HCD for software view
    - I/O device definitions (software view of I/O)
  - Additional system-wide options

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Enabling Dynamic I/O on Hardware

- Supported on IBM processors since 9021
  with VM/ESA Version 2 Release 1 (circa 1994)

- All models with a Hardware Management Console (HMC)

  - Customize Activation Profiles

  - Select your Processor profile

  - View the "Dynamic" 'tab'

  - Check the box for "Allow dynamic
    changes to the channel subsystem
    input/output (I/O) definition"

Enabling Dynamic I/O on Hardware

- Allow **One** LPAR to Control I/O for Entire CEC
  - Choose which LPAR will "own" the configuration and make all changes from that LPAR
    - Hardware and software I/O configurations are synchronized using configuration tokens
      - *Tokens are different between HCD and native z/VM CP Commands*
      - *Multiple LPARs using the same token format* can *make changes –* ***be careful!***

- All models with a Hardware Management Console (HMC)
  - Customize Activation Profiles
  - Select your LPAR profile
  - View the "Security" 'tab'
  - Check the box for "Input/output (I/O) configuration control"

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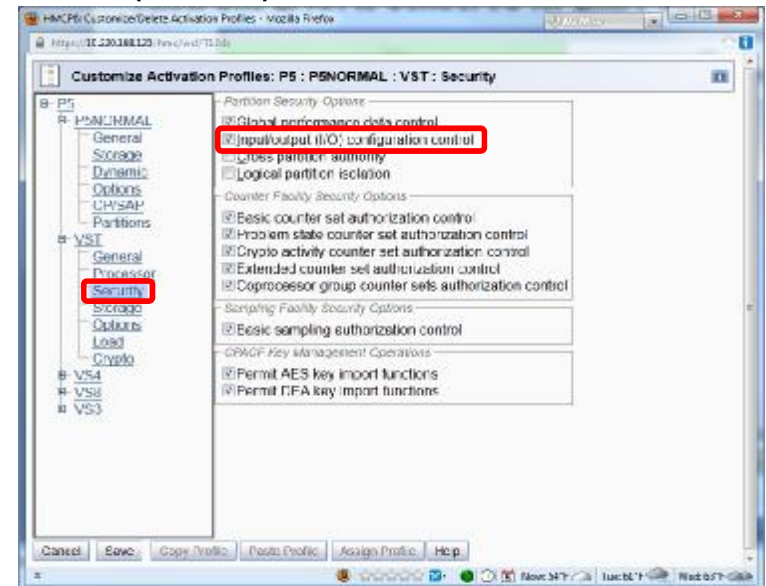
Hardware Token

- ## z/VM Token

  Query TOKEN
  HCPCCO6816E Dynamic I/O changes are not allowed on this system
  The target channel subsystem configuration token is:

  VM-TOKEN11/03/0509:46:34   ....08/18/0523:32:53PSYS   IODF03

- ## HCD Token

  Query TOKEN
  HCPCCO6816E Dynamic I/O changes are not allowed on this system
  The target channel subsystem configuration token is:
  P4   ....wO..................13-07-1808:01:07PSYS   IODF71

Enabling Dynamic I/O in z/VM

- ## SYSTEM CONFIG – HCD
  - IODF IODF xx [OSCONFIG SYSTEM_CONSole SYSTEM_3270]
    - Specify IODF information to z/VM CP

- ## SYSTEM CONFIG – CP Commands
  - Features, Enable,
    - DYNamic_I/O,   Allow hardware I/O changes
    - SET_DYNamic_io,   Allow use of SET DYNamic ON/OFF command
    - SET_DEVices,   Allow privileged users to reset CP's view of real devices
    - NEW_DEVices_initialized_when_added
      - CP will create a real device control block (RDEV)
      - when it receives an I/O machine check (IOMCK)

- ## Copy the IODF file to the MAINT CF1 disk
  - z/VM will not IPL if IODF is specified in SYSTEM CONFIG and the IODF file is not found
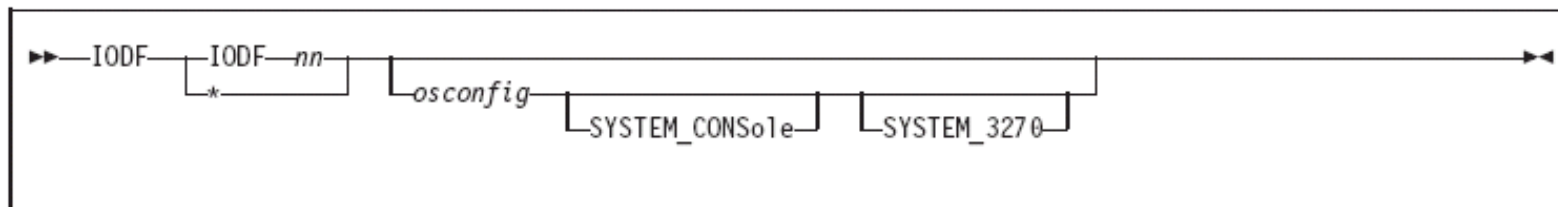
One Time Hardware Enablement

- Shutdown VM and all other systems on the processor
- POR (IML / Activate) the processor
  - Must be done once to activate an IOCDS with a valid TOKEN
    - The token is put into the IOCP source by:
      - *The z/VM IOCP command*
      - *HCD generation of an IOCP deck*
  - Stand-Alone IOCP on all processors later than 9672 CMOS processors can write an IOCDS using a source file with a TOKEN

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Using HCD

SYSTEM CONFIG
HCD

- IODF statement
  - IODF*nn*
    - Name of the IODF file to be used
    - Filetype must be PRODIODF
    - Must reside on PARM disk
  - *osconfig*
    Optional specification of VM I/O configuration in the IODF
  - *SYSTEM_CONSole*
    - Specifies that the Operating System Messages panel on the Hardware Management Console can serve as a system operator console.
    - Can only be used if *osconfig* specified
  - *SYSTEM_3270*
    - Specifies that the integrated 3270 console on the Hardware Management Console can serve as a system operator console.
    - Can only be used if *osconfig* specified
  - Specify only IODF*nn* to cause HCD management of only hardware I/O configuration

```
►►──IODF───┬─IODF──nn─┬──────────────────────────────────────────►◄
           └─*─┘      └─osconfig─┬──────────────────┬─┬──────────────┬─
                                 └─SYSTEM_CONSole─┘ └─SYSTEM_3270─┘
```

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SYSTEM CONFIG
HCD

- Statements always ignored when IODF specified
  - Subsequent IODF statements (i.e. only the first IODF statement remains valid)
  - FEATURES DISABLE/ENABLE DYNAMIC_IO
  - FEATURES DISABLE/ENABLE SET_DYNAMIC_IO

- Statements ignored when an IODF statement with osconfig is specified
  - RDEVICE
  - DEVICES ACCEPTED/NOTACCEPTED
  - DEVICES DYNAMIC_I/O/NOTDYNAMIC_I/O
  - DEVICES OFFLINE_AT_IPL/ONLINE_AT_IPL
  - DEVICES SENSED/NOTSENSED
  - DEVICES SHARED/NOTSHARED
  - HOT_IO_RATE
  - OPERATOR_CONSOLES
  - EMERGENCY_MESSAGE_CONSOLES
  - FEATURES DISABLE/ENABLE SET_DEVICES

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HCD Tasks Using EXECs

- Import IOCP source to HCD
  ```
  cbdsmigr iodf03 workiodf a proc1 iocp a i proc1 2817-m32 lpar
  ```

- Convert a work IODF to a production IODF
  ```
  cbdsprod iodf03 workiodf a iodf03 prodiodf a
  ```

- Copy a production IODF to a work IODF
  ```
  cbdswork iodf03 prodiodf a iodf04 workiodf a
  ```

- Test IODF Activation
  ```
  cbdsact iodf03 proc1 [*|os1] (test
  ```

- Dynamically activate hardware (and optionally software) configuration
  ```
  cbdsact iodf03 proc1 [*|os1] a1
  ```

- Generate IOCP source file
  ```
  cbdsiocp iodf03 prodiodf a proc1 d cpc1 iocp a [(sa|nosa]
  ```

- Generate a report from the IODF
  ```
  cbdsrep iodf03 prodiodf a filename listing a X
  ```

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Make a Change Using z/VM HCD and HCM

- How to import IOCP source to HCD

  ```
  cbdsmigr iodf03 workiodf f machine1 iocp a i machine1 9672-x77 lpar
  ```

  - May require significant modifications to IOCP source to provide information required by HCD
    - Identify common resources
    - Produce accurate and complete connectivity
  - Tags not fully documented
    - HCD and $HCDC$
    - Examples in "z/VM I/O Configuration" manual
    - Some add details
      - *Serial numbers, descriptions, switch input ports, more…*
    - Some add whole definitions
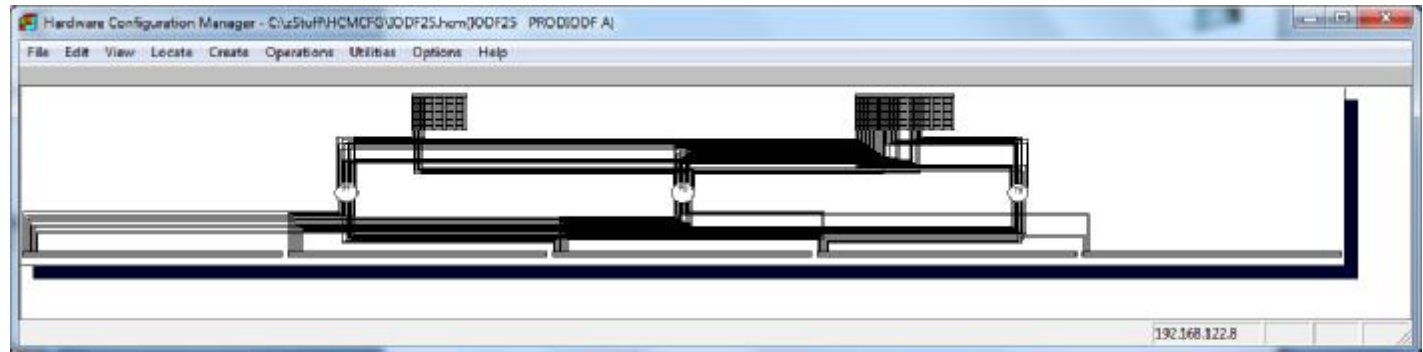
      ```
      *$HCD$   SWITCH   SWID=67,ADDRESS=67,SERIAL='106412L   `
      *$HCDC$           DESC='DCX1 SAN768 NDC67',PORT=((00,FE)),UNIT=2032
      *$HCDC$           SWPORT=((00,77,00),(01,77,01),(10,77,10),(21,77,21)
      *$HCDC$           (30,77,30),(31,77,31),(60,77,60),(70,77,70),(71,77,71))
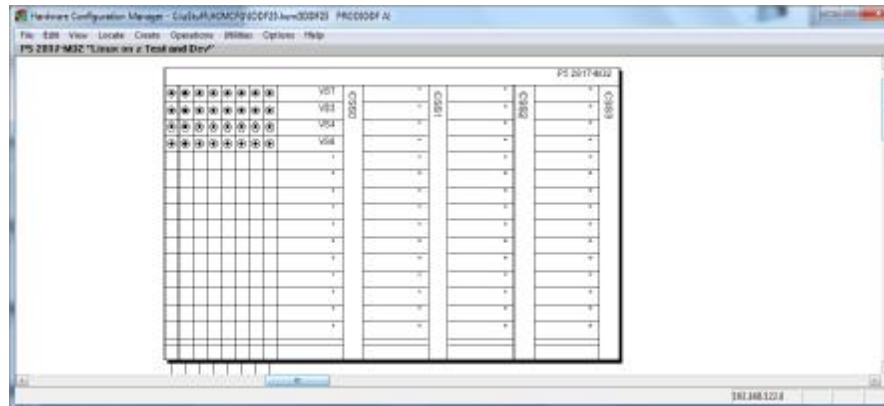      ```

# Make a Change Using z/VM HCD and HCM

- Import IOCP into a work IODF for HCD **OR** copy production IODF to work IODF

- Optionally import z/VM SYSTEM CONFIG I/O definitions

- Download the HCM client to a Windows® workstation
  - Install and configure to point to z/VM host

- Start the HCD TCP/IP dispatcher for HCM – cbdsdisp

- Open the IODF in HCM
  - z/VM HCM produces errors using z/OS IODF
    ```
    W CBDA269I No Unit Information Table found for 3390B.
    ```
  - Complex multi-CPC IODF is *very* slow to load

- Make changes using HCM

- Stop the HCD TCP/IP dispatcher – server stop

- Use the HCD cbdsact command to activate the changes

# Make a Change Using z/VM HCD and HCM

- HCM graphical rendering may be difficult to use due to complexity



- Zoom may show too little

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# Make a Change Using z/OS and Activate using z/VM HCD

- Update the IODF using z/OS HCD
  - Create a new work IODF from the latest production IODF
  - Use either ISPF panels of HCM to make the changes
  - Finalize as a production IODF
- Export the IODF and transfer to CBDIODSP user-id on VM
- Use the HCD cbdsact command to activate the changes

# Transfer IODF from z/OS to z/VM

- Use z/OS HCD to EXPORT IODF and send to VM
  - Send via NJE if connected
    - Specify CBDIODSP in the **User ID** field and the correct NJE **Node ID**
    - Use RECEIVE command on the CBDIODSP user-id
  - Create a sequential file and send via FTP
    - Specify * in both the **User ID** and **Node ID** fields of z/OS HCD Export
    - A sequential dataset will be created
    - Use FTP or any other valid method to transfer to CBDIODSP on VM
      - *Remember to use binary transfer if an ASCII transfer is in the chain*

  - The exported z/OS IODF sequential file is the same format as an IODF created or maintained by z/VM HCD

# Conclusions

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# Conclusions

- When z/OS is present on the CPC
  - Use z/OS to maintain the IODF and IOCDS
  - Use z/VM dynamic capability to sense hardware changes and dynamically manage its software I/O configuration

- When z/OS is at the site and there are shared I/O resources
  - Use z/OS to maintain the IODF
  - Export the IODF to z/VM and use z/VM HCD to update HSA and the IOCDS
  - Use z/VM dynamic capability to sense hardware changes and dynamically manage its software I/O configuration

- For stand alone CPC and/or new to z/VM
  - Use z/VM HCD and HCM
    - Limited examples
    - Limited customer exploitation

- For experienced (or adventurous) user
  - Use IOCP and Native z/VM commands
    - NOTE: No safeguards; Errors are easy to make

# Questions?

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# Bibliography

- Dynamic I/O Commands **HELP DYNIO**

- Library bibliography **HELP LIBRARY**
- Pointer to VM publications from http://www.vm.ibm.com/library

- z/VM V6R2 I/O Configuration SC24-6198-02
- z/VM CP Messages and Codes GC24-6177-03
- z/VM V6R2 CP Planning and Administration SC24-6178-03
- z/VM V6R2 CP Commands and Utilities Reference SC24-6175-03

- z/OS 1.13 and z/VM 6.2 HCM User's Guide SC33-7989-13
- z/OS 1.13 and z/VM 6.2 HCD Messages SC33-7986-13

# Bibliography

- IOCP User's Guide
    - Get the latest one that includes your CPC module
        - For z990 and all later models:

        System z Input/Output Configuration Program User's Guide for ICP IOCP SB10-7037-10

- Hardware Management Console Operations Guide
    - You will need to get the correct manual for your CPU model and SEC.

# Contact Information

**Rick Barlow**

**Senior z/VM Systems Programmer**

**Phone: (614) 249-5213**

**E-mail: Richard.Barlow@nationwide.com**

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# Optional

# Using CP Commands

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# SYSTEM CONFIG
# CP Commands

- ## Features section
  - ### Enable and Disable sections
    What functions can and cannot be used
  - ### Recommended for Enable
    - Authorize users system-wide to use certain functions
      - *SET_DYNamic_i/o, SET_DYNamic_io*
        *Allow turning Dynamic I/O on and off*
      - *SET_DEVices*
        *Allow changing the software view*
    - Tell CP whether, and how, to activate certain system functions
      - *NEW_DEVices_initialized_when_added*
        *How to handle hardware MCH interrupts*
  - ### Recommended for Disable
    - Disable Hardware I/O Changes
      - *DYNamic_i/o, DYNamic_io*
        *Allow dynamic changes*
      - *Dynamic changes can be enabled with CP SET DYN ON when changes will be done*

# SYSTEM CONFIG extract
# CP Commands

```
/*********************************************************************/
/*                     Features Statement                          */
/*********************************************************************/


Features ,
  Enable ,                         /* Enable  the following features */
    SET_DEVices,                   /* Allow changing of devices bitmaps */
    SET_DYNamic,                   /* Allow use of Set Dynamic On/Off Cmd */
    NEW_DEVices_Initialized_When_added,       /* Online at IO MCH */


 . . .


  Disable ,                        /* Disable the following features */
    DYNamic_I/O,                   /* Disable hdw i/o changes        */
```

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SYSTEM CONFIG
CP Commands

- Rdevice statements
  - I/O device definitions (software view of I/O)
    - Only necessary for devices which do not respond to sense ID
    - Alter default characteristics for specific devices
      - *Channel-attached Printers*
- How to handle specific devices at initialization
- Which devices to bring online at IPL time
- How to handle hardware I/O interrupts

- All of these are ignored if IODF is in use

SYSTEM CONFIG extract
CP Commands

```
/**************************************************************/
/*    Special RDEV statements - things that cannot be sensed        */
/**************************************************************/

   Rdevice   0020-002D     Type    TELE2_ADAPTER
   Rdevice   002E          Type    BSC_ADAPTER
   Rdevice   002F-0030     Type    TELE2_ADAPTER
   Rdevice   0031-0038     Type    BSC_ADAPTER
   Rdevice   0039          Type    TELE2_ADAPTER
   Rdevice   003A-003F     Type    BSC_ADAPTER
   Rdevice   06F0-06FF     Type    3420 Model 8 Dual_Density Yes
   Rdevice   0D0C          Type    IMPact_Printer Afp No


   VMTEST: VMSOUTH: Rdevice   0700-076F Type Tape
   VMTEST: VMSOUTH: Rdevice   0B00-0B40 Type Tape
   VMTEST: VMSOUTH: Rdevice   10A0-10AF Type 3270_display
   VMTEST: VMSOUTH: Rdevice   0EA0-0EBF Type Tape
   VMTEST: VMSOUTH: Rdevice   0EA0-0EBF Type Tape
   VMTEST: VMSOUTH: Rdevice   0C40-0C5F Type CTCA
```

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SYSTEM CONFIG extract
CP Commands

```
VMB: VMTEST: Devices ,
    INITialized_at_ipl 0000-FFFF,
    NOTINITialized_at_ipl,
                A0C0-A0FF A1C0-A1FF A2C0-A2FF A3C0-A3FF, /* PAV */
                9000-9FFF,              /* RDC3 DS8100            */
                5000-5FFF,              /* FlashCopy targets      */
    Online_at_IPL   0000-FFFF,
    Offline_at_IPL  0020-0030 0033-0035 0037-003F,   /* EP devices */
                0D07 0D0B-0D0E 0D90-0D97,       /* printers   */
                0881 0891 0883,                 /* LMU - EDC-N */
                0892 0893,                      /* LMU - RESS */
                A0C0-A0FF A1C0-A1FF A2C0-A2FF A3C0-A3FF, /* PAV */
                9000-97FF 9801-9FFF, /* RDC3 DS8100           */
                5000-5FFF,           /* RDC3 DS8100 FC targets */
    Sensed          0000-FFFF,
    NotSensed,

                A0C0-A0FF A1C0-A1FF A2C0-A2FF A3C0-A3FF, /* PAV */
                9000-97FF 9801-9FFF, /* RDC3 DS8100           */
                5000-5FFF,           /* RDC3 DS8100 FC targets */
    NOTACCEPTED,

                A0C0-A0FF A1C0-A1FF A2C0-A2FF A3C0-A3FF, /* PAV */
                9000-97FF 9801-9FFF, /* RDC3 DS8100           */
                5000-5FFF            /* RDC3 DS8100 FC targets */
```

Safe Dynamic I/O

- Does not apply to HCD / HCM because HCD handles

- Dynamic I/O changes must be implemented in a careful process or you will not be able to activate a new IOCDS and all dynamic changes will be lost at a future machine POR.

- The designers call this a LOCKSTEP process.
  - Plug-and-Play mode available for the adventurous

- I recommend using an EXEC for all commands so that return codes can be checked and no further commands are executed.

How to make a change using z/VM CP commands

- Update the IOCP source statements with proposed changes
- Run **IOCP** EXEC with NOWRT option to check syntax
  - Do not load or activate
- Use a "compare" utility to show the differences between old and new IOCP decks
- Code the necessary CP commands into an EXEC
- Issue CP commands to dynamically make changes
  - **NOTE**: If any command fails, keep track of what was completed. Either reverse the completed commands or fix the failed commands. Write either the old or a new IOCP to a new IOCDS and activate it.
- If commands complete successfully, run **IOCP** EXEC again with write option to create an IOCDS
- Issue **CP SET IOCDS_active** command to activate the new IOCDS
  - This will change the hardware pointer so that the new IOCDS is selected at a future POR.

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Verify Dynamic is Enabled

- Verify that Dynamic I/O changes are allowed

    Query DYN

    Dynamic I/O changes are not allowed on this system

- Why?

    - Features Disable DYNamic_I/O is in my SYSTEM CONFIG
    - Enable it:

        CP SET DYNamic ON

        System is now enabled for dynamic I/O changes

- Verify that Dynamic I/O changes are allowed

    Query DYN

    Dynamic I/O changes are allowed on this system

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IOCP Statements

• CHPID Statement

```
[symbol]   CHPID   PATH=(chpid number[,chpid number]...)
                   TYPE=(BL | BY | CBY | CVC | CNC | CTC | CFP | CFR | CFS |
                         CBP | CBR | CBS | ICP | OSA | OSD | OSE | FCV |
                         FC | FCP | IQD}
                   [SWITCH=number]
                   [PART=((name0[,REC)|
                          (access list)|
                          ((access list)[,(candidate list)][,REC])}]
                   [PARTITION=((name0[,REC)|
                               (access list)|
                               ((access list)[,(candidate list)][,REC])}]
                   [NOTPART=((access list)|
                             ((access list)[,(candidate list)])|}]
                   [SHARED]
                   [CPATH=(chpid number[,chpid number]...)]
                   [OS=value]
                   [IOCLUSTER=name]
```

• CNTLUNIT Statement

```
[symbol]   CNTLUNIT   CUNUMBR=number
                      PATH=(chpid[,chpid]...)
                      [LINK=(link address[,link address]...)]
                      [CUADD=address]
                      [PROTOCL={D|S|S4}]
                      SHARED={Y|N}
                      UNIT=type
                      UNITADD=((address[,number]),...)
```
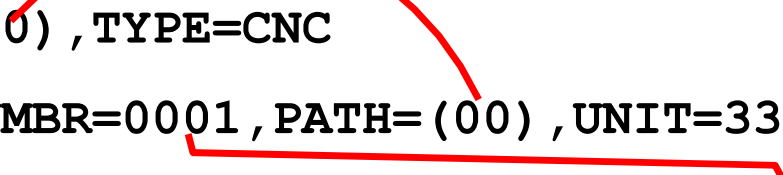
IODEVICE Statement

```
[symbol]   IODEVICE   ADDRESS=(address[,number])
                      CUNUMBR=(number[,number]...)
                      [MODEL=model]
                      [{PART | PARTITION | NOTPART}=(name[,name]...)]
                      [PATH=choid]
                      [TIMEOUT={Y|N}]
                      UNIT=device
                      [UNITADD=address]
                      [STADET={Y|N}]
```

IOCP Statement Relationship

```
CHPID00   CHPID PATH=(00),TYPE=CNC

DASDCU01 CNTLUNIT CUNUMBR=0001,PATH=(00),UNIT=3390

DASD0001 IODEVICE ADDRESS=(1000,256),CUNUMBR=(0001),
                  STADET=Y,UNIT=3390
```

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Adding a String of DASD

- IOCP statements being added (from some compare process)

```
CHPID PATH=(05),SHARED,                                      *
      PARTITION=((MVS1,VM1,VM2),(MVS1,VM1,VM2)),SWITCH=01,   *
      TYPE=CNC
CHPID PATH=(31),SHARED,                                      *
      PARTITION=((MVS1,VM1,VM2),(MVS1,VM1,VM2)),SWITCH=01,   *
      TYPE=CNC
CHPID PATH=(89),SHARED,                                      *
      PARTITION=((MVS1,VM1,VM2),(MVS1,VM1,VM2)),SWITCH=02,   *
      TYPE=CNC
CNTLUNIT CUNUMBR=1340,PATH=(05,89),UNITADD=((00,128)),       *
      LINK=(A1,A1),UNIT=3990
CNTLUNIT CUNUMBR=1440,PATH=(31),UNITADD=((00,128)),          *
      LINK=(E1),UNIT=3990
IODEVICE ADDRESS=(4000,128),CUNUMBR=(1340,1440),STADET=Y,    *
      UNIT=3390
```

- Commands to verify syntax of new (complete) IOCP source file
  - IOCP NEWIOCP2 (NOWRT DYN LPAR

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Adding a String of DASD

- Commands (in an EXEC)

```
/* Dynamically add a string of DASD */
Address 'COMMAND'
'CP SPOOL CONSOLE TO * START NAME DYNAMIC IOCP'
Signal On Error
Trace 'C'
'CP DEFINE CHPID 05 TYPE CNC SWITCH 01',
                'SHARED ACC MVS1 VM1 VM2 INIT MVS1 VM1 VM2'
'CP DEFINE CHPID 31 TYPE CNC SWITCH 01',
                'SHARED ACC MVS1 VM1 VM2 INIT MVS1 VM1 VM2'
'CP DEFINE CHPID 89 TYPE CNC SWITCH 02',
                'SHARED ACC MVS1 VM1 VM2 INIT MVS1 VM1 VM2'


'CP DEFINE CU 1340 TYPE ESCON UNITADD 00-7F LINK A1 PATH 05 89'
'CP DEFINE CU 1440 TYPE ESCON UNITADD 00-7F LINK E1 PATH 31'


'CP DEFINE DEV 4000-407F UNITADD 00 CU 1340 1440 DASD STAT'


Signal Off Error
'EXEC IOCP NEWIOCP2 (WRTA4 LPAR DYN IZP DESC1 SYS1 DESC2 IODF02'
Say 'IOCP RC='rc
If rc \> 4 Then Do
  'ERASE NEWIOCP2 LISTING'
  'CP SET IOCDS A4'
  End
Error:
erc = rc
'CP SPOOL CONSOLE STOP CLOSE'
Exit erc
```

SHARE in Boston

Adding a String of DASD

- Verify CHPID status

```
Query CHPIDS
        0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
0x  +  .  .  .  +  -  +  +  .  .  +  .  +  +  +  +
...
3x  +  -  +  +  +  +  +  +  +  +  +  +  .  .  .  .
...
8x  +  -  +  +  -  .  .  .  +  -  +  +  +  +  +  +
...
Bx  +  .  +  +  +  +  +  +  +  +  +  +  +  .  +  .
...
Dx  .  -  .  .  .  .  -  .  -  .  .  .  +  +  +  +
...
+ Available
- Offline
. Not configured
```

- Query the paths to the device

```
Query PATHS 4000
    Device 4000 does not exist
```

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Adding a String of DASD

- ## Vary the channel path online
  ```
  vary on chpid 05
  Channel path 0005 was successfully varied online
  Device 4000 is available and online.
  Device 4001 is available and online.
  ...
  Device 407F is available and online.
  ```

- ## Query the devices
  ```
  q 4000-407f
  DASD 4000 IB4000, DASD 4001 IB4001, DASD 4002 IB4002, DASD 4003 IB4003,
  DASD 4004 IB4004, DASD 4005 IB4005, DASD 4006 IB4006, DASD 4007 IB4007,
  ...
  DASD 407C IB407C, DASD 407D IB407D, DASD 407E IB407E, DASD 407F IB407F
  ```

Adding a String of DASD

- ## Verify CHPID status
  Query CHPIDS

  ```
          0  1  2  3  4  5  6  7  8  9  A  B  C  D  E  F
  0x      +  .  .  .  +  +  +  +  .  .  +  .  +  +  +  +
  ...
  3x      +  -  +  +  +  +  +  +  +  +  +  .  .  .  .  .
  ...
  8x      +  -  +  +  -  .  .  .  +  -  +  +  +  +  +  +
  ...
  Bx      +  .  +  +  +  +  +  +  +  +  +  +  +  .  +  .
  ...
  Dx      .  -  .  .  .  .  -  .  -  .  .  .  +  +  +  +
  ...
  + Available
  - Offline
  . Not configured
  ```

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Adding a String of DASD

- Query the paths to the device

```
Query PATHS 4000
    Device 4000, Status ONLINE
      CHPIDs to Device 4000 (PIM)   : 05 31 89
        Physically Available (PAM)  : +   -   -
        Online               (LPM)  : +   -   -
                                Legend    + Yes - No
```