zSeries 900
S/390 Multiprise 3000 Enterprise Server
S/390 Coupling Facilities C01/C02/C03/C04/C05
S/390 Multiprise 2000
S/390 Application StarterPak
S/390 Parallel Enterprise Servers Rn1/Rn2/Rn3
S/390 Parallel Transaction Server - E0n and P0n

Purpose and Description For Version 1.7.1/DR38
April 30, 2001
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1.0 Purpose and Description for Version 1.7.1/DR38

1.1.1 Overview of Customer and/or Service Enhancements

Version 1.7.1/DR38 includes the following customer and/or service enhancements for the subject systems:

- Engineering change (EC) considerations for:
  - CPC EC J10005 + MCLs
  - HMC EC J10012 + MCLs
- For the zSeries 900
- For earlier 9672/9674/2003/3000/7060 Models
- Electronic Service Agent
- Miscellaneous lower level ECs included in Version 1.7.1/DR38
- Input/output configuration program (IOCP) considerations
- Preventive service planning (PSP) bucket considerations

**Important**

This statement of enhancements assumes that the customer has all the necessary hardware and software prerequisites and corequisites. EC support for features does not include the feature itself.

1.1.2 Engineering Change (EC) Considerations

Version 1.7.1/DR38 for zSeries 900 includes the following Central Processor Complex (CPC) and Hardware Management Console (HMC) Licensed Internal Code (LIC) engineering change (EC) and Microcode Load (MCL) levels:

- CPC level: EC J10005 + MCLs
- HMC level: EC J10012 + MCLs

Version 1.7.1/DR38 includes HMC code EC J10012 for the S/390 Multiprise 3000 Enterprise Server, Parallel Enterprise Server - Generations 3, 4, 5, and 6, Coupling Facility Models C01 - C05, Multiprise 2000, Application StarterPak, Parallel Enterprise Server - RN1, RN2, RN3 Models, and Parallel Transaction Server models includes the following Hardware Management Console (HMC) Licensed Internal Code (LIC) engineering change (EC) and Microcode Load (MCL) levels:

- HMC level: EC J10012 + MCLs

To verify that the enhancements described in this document apply to your system, display the LIC EC levels running on the CPC and the HMC.

1.1.2.1 CPC EC J10005 + MCLs

You can display the LIC EC and MCL level of the system's CPC as follows:

1. Select the CPC
2. Drag and drop the CPC onto the System Information object in the Change Management Tasks list.

A list of CPC EC levels and (activated) MCL levels displays. Verify that EC level J10005 is in this list.
1.1.2.2 HMC EC J10012 + MCLs
You can display the LIC EC and MCL level of the system’s HMC as follows:

1. Open (double-click on) the Console Actions object
2. Open (double-click on) the View Console Information object

A list of HMC EC levels and (activated) MCL levels displays. Verify that EC level J10012 is in this list.

1.1.3 For the zSeries 900
CPC EC J10018 and Hardware Management Console EC J10016 will be applied to the Support Elements and Hardware Management Consoles respectively on all new builds of these models. It is also available as an upgrade to the Support Elements and Hardware Management Consoles on existing models.

1.1.3.1 The Benefits
The zSeries 900 with DR38G delivers additional feature and function further enhancing connectivity and workload balancing.

DR38G includes the introduction of: the zSeries 900 coupling facility model. The zSeries 900 coupling facility model is:

- Machine type: 2064
  - Model: 100
    - 1-9 way coupling facilities

You can upgrade current 9672 R06 models to the zSeries 900 coupling facility model. In addition, upgrades from the coupling facility model to the general purpose models are available.

1.1.3.2 Design Highlights
zSeries 900 General Purpose Models
With DR38, the following function is added:

- Intelligent Resource Director (IRD)
- Workload based pricing (In observation mode)
- FICON Architecture and FICON channels
  - Native FICON feature
  - FICON Shortwave feature
- Coupling links
  - InterSystem Coupling-3 (ISC-3) peer links (Peer mode)
  - Integrated Cluster Bus (ICB-3) peer links (Peer mode)
- Increased number of HSA subchannels from 288K to 512K; increased the number of image (and basic mode) subchannels from 36K to 63K. These increases over G5/G6 and those supported with DR36.
- Extended Translation Facility (Unicode enhancement)
- Capability to enable Electronic Service Agent (See 1.1.5, “Electronic Service Agent” on page 7 for details of this enhancement.)
zSeries 900 Coupling Facility Model

The design of these models supports:

- Logically partitioned (LPAR) operating mode that allows you to define coupling facility logical partitions. You can define up to 15 logical partitions.
- CHPID assignment
- Internal Coupling Facility CPs (ICFs)
- Coupling links
  - InterSystem Coupling-3 (ISC-3) links (Compatibility and Peer mode)
  - Integrated Cluster Bus (ICB-3 Peer mode and ICB-2 Compatibility mode) links
- Parallel Sysplex Coupling Facility Control Code (CFCC)
- High levels of reliability, availability, and serviceability
- Online information

1.1.3.3 Some Design Details

**Intelligent Resource Director (IRD)**

Intelligent Resource Director (IRD) is a function which optimizes your workload's resource utilization across multiple logical partitions. IRD provides the ability to dynamically manage workloads within multiple logical operating system images executing on a single zSeries 900, as a single large-scale compute resource, with dynamic workload management and physical resource balancing built into the native operating system and underlying hardware.

With IRD, z/OS WLM and WLM will exploit Parallel Sysplex technologies to monitor performance of workloads on multiple images against those workload goals. z/OS WLM will then interact with the PR/SM hypervisor, directing PR/SM to dynamically adjust the physical CPU and I/O resource allocation of the hardware across the multiple operating system instances, without requiring Parallel Sysplex data-sharing to achieve these benefits, and totally transparent to your workload applications.

IRD not only combines PR/SM, z/OS WLM, and Parallel Sysplex for LPAR CPU management, but it also includes two additional zSeries 900 exclusives: Dynamic Channel Path Management (DCM), and (Channel) I/O Subsystem Priority Queuing to increase business productivity.

**Connectivity Enhancements**

With DR38, the zSeries 900 provides new peer mode coupling design for external links. Peer mode was previously only available for Internal Coupling links (IC-3). Two modes of coupling operation are now available: Peer Mode and Compatibility Mode.

An additional mode of operation (Peer) for ISC-3 is delivered, providing significantly faster performance when operating within the zSeries 900 family. Also, the ICB-3 feature is available in Peer mode operation providing significantly faster performance when operating within the zSeries 900 family. They are defined using HCD/IOCP.

- **Peer Mode** is new with DR38 and supports coupling between zSeries 900s and provides both sender and receiver capability on the same link. Peer links provide up to 7 expanded buffer sets (compared to 2 buffers with G5 and G6 servers). With these design improvements, the new Peer Mode CF links transmit at a data rate twice that of older links. All peer channels can
be shared between several ESA logical partitions and one CF logical partition.

- **Compatibility Mode** was previously available at DR36 and supports coupling between zSeries 900s and S/390 Parallel Sysplex Servers. ISC-3 links defined in Compatibility Mode (defined as sender/receiver CHPID types) have a maximum link rating of at 100 MB/second. ICB-2 links which can only operate in Compatibility Mode have a maximum link rating of at 333 MB/second.

**Notes:**

1. While compatibility mode can be used between zSeries 900s, IBM recommends, for increased performance, using peer mode when coupling between zSeries 900s.

2. zSeries 900 provide the following maximum coupling link features:
   - 16 ICB-3's
   - 8 ICB-2's on GP models; 16 ICB-2's on the CF model (model 100)
   - 32 ISC-3's
   - There is a combined maximum of a total of 32 ICB-2 + ICB-3 + ISC-3 links.

3. With Driver 38G there is a new hardware ISC-3 Daughter card. This high speed link is a corequisite with the driver and delivers both modes of operation, compatibility mode, as well as the additional function of PEER mode operation. The older hardware link will not function with this new driver.

ISC-3 links allow coupling over a distance of 10 km.

**Capacity Upgrade on Demand and Enhancements**

Capacity Upgrade on Demand (CUoD), available on most general purpose models, provides the ability to add one or more Central Processors (CP's) and virtual servers dynamically and non-disruptively.

Improving on IBM's 9672 G6 servers, zSeries 900 now provides more flexible growth of I/O connectivity. Installations may non-disruptively install FICON and ESCON channels, OSA-Express ATM 155, Gb Ethernet, and Fast Ethernet connections, Dual PCI Cryptographic Coprocessors, and InterSystem Coupling-3 links and Integrated Cluster Bus (2 and 3) links. You should use Plan-Ahead to insure you have enough I/O slots for future needs.

**1.1.3.4 Availability**

Capacity Backup (CBU) is an optional feature that provides a high level of availability. This optional feature gives customers the ability to provide for unexpected workload demand, facilitating seamless processor upgrades for specified short durations.

**1.1.3.5 HSA**

The Hardware System Area (HSA) contains the CPC Licensed Internal Code (LIC) and configuration dependent control blocks. HSA is not available for program use.

The HSA size varies according to:
• Power-on reset (POR) mode of the CPC
• Number of installed CP's and SAP’s
• Size and complexity of the system I/O configuration
• Whether or not dynamic I/O configuration is enabled

Note: Because of the 512K HSA subchannel capability, using a large expansion percentage will have an additional impact on the HSA size.

• Whether or not concurrent LIC patches are authorized

HSA Size Notes:

1. When counting channels without dynamic I/O enabled, count the number of channels defined in the IOCDS, not the number of installed channels. With dynamic I/O enabled, HSA is allocated assuming maximum (256) channels.

2. To determine the number of HSA subchannels, refer to the IYP IOCP IODEVICE report under the HSA Total column for Subchannels. If you use HCD, you can find the total number of HSA subchannels in the Device Detail report.

If dynamic I/O configuration is enabled, apply the expansion factors you specified on the Dynamic I/O Options panel in the current Reset profile.

Some amount of installed central storage is reserved for the HSA to hold processor Licensed Internal Code (LIC).

Basic Mode HSA Allocation for general purpose models’ CPCs

For general purpose models’ CPCs for Basic mode, plan for a maximum of 128 MB for HSA.

If your CPC is in Basic mode and dynamic I/O configuration changes are enabled, your HSA size includes 4 to 6 MB for coupling facility, depending on the installed storage. If your CPC is in Basic mode and dynamic I/O configuration changes are NOT enabled, your HSA size includes 5 MB for coupling facility if a CF channel path is defined in your IOCDS.

The HSA size required for concurrent LIC patches in Basic mode is approximately 8 MB.

The HSA granularity in Basic mode is 1 MB.

LPAR Mode HSA Allocation for General Purpose Models’ CPCs

When you initially define the amount of central storage to allocate to your partitions, it is recommended that you assume that a maximum amount of 256 MB or 384 MB is required for the HSA.

• Assume 256 MB if your memory is ≤ 32768 MB.
• Assume 384 MB if your memory is > 32768 MB.

If your CPC is in LPAR mode, your HSA size includes 5 MB to 25 MB for coupling facility depending on the number of logical partitions defined and on the installed storage.
The HSA size required for concurrent LIC patches in LPAR mode is approximately 10 MB.

If future additions of I/O are planned (concurrent conditioning), be sure to provide enough HSA for additional devices by specifying a large enough dynamic expansion percentage at IML, or by overgenering your IOCDS to define anticipated additions. Until dynamic I/O support for peer coupling channels is available (4Q01), overgenering should be exploited for peer coupling channels.

The HSA Granularity in LPAR mode depends on the memory increment size. See the zSeries 900 System Overview, SA22-1027, for details on HSA granularity.

1.1.3.6 Hardware Description

zSeries 900 Models coupling facility model Frame Configuration

The zSeries 900 frames are enclosures built to Electronic Industry Association (EIA) standards. The “A” frame contains two cage positions. The top cage position contains a single Central Processor Complex (CPC) and its associated processing units (CFs) storage, and power components. The bottom cage position may only contain an I/O expansion cage for channel attachment capability. Frame “B” contains the optional Integrated Battery Features (up to 6). Frame “B” is attached to frame “A”, and is only available as a factory installed option.

The zSeries 900 coupling facility model is only available as a single CPC in a one or two frame configuration depending on the inclusion of an optional Integrated Battery Feature (IBF). The “A” frame bottom cage position may contain an I/O expansion cage required for channel attachment capability. The minimum configuration of the zSeries 900 coupling facility model consists of a single frame, the “A” frame, which contains a single cage, the CPC cage.

I/O Subsystem

The zSeries 900 coupling facility model supports InterSystem Coupling-3 (ISC-3) channels and Integrated Cluster Bus (ICB-3 and ICB-2) channels.

1.1.3.7 Hardware Configuration for the Coupling Facility Model

The coupling facility model is a stand-alone coupling facility and is recommended for use as a production coupling facility.

The coupling facility model provides the following hardware elements:

- One Central Processor Complex (CPC)
- Integrated ICFs: 1 to 9
- Integrated SAPs: 2 SAPs assigned
- Memory:
  - 5GB minimum, 32GB maximum
  
  Valid memory configurations are 5GB, 6GB, 7GB, 8GB, 10GB, 12GB, 14GB, 16GB, 18GB, 20GB, 24GB, 28GB, and 32GB
• Up to 15 logical partitions (LPs) are supported
• One Hardware Management Console (up to three additional optional Hardware Management Consoles are available) and two Internal Support Elements
• A Token-Ring Network Multistation Access Unit (MAU)
• A Modular cooling unit (MCU)
• Internal Battery Feature (IBF)
• Channels:
  – InterSystem Coupling-3 (ISC-3) channels:
    - 0 minimum; 32 maximum; available in increments of 1
  – Integrated Cluster Bus (ICB-3) channels:
    - 0 minimum; 16 maximum; available in increments of 1
  – Integrated Cluster Bus ICB-2 channels:
    - 0 minimum; 16 maximum; available in increments of 1
  – The Channel Subsystem (CSS) for the coupling facility model consists of InterSystem Coupling-3 (ISC-3) channels and Integrated Cluster Bus (ICB-3 and ICB-2) channels.
  – There is a combined maximum of 32 ICB-2 + ICB+3 + ISC-3 links

1.1.4 For Earlier 9672/9674/2003/3000/7060 Models
EC J10012 will be applied to the Hardware Management Consoles on all new builds and available as an upgrade to the Hardware Management Consoles on the following models:
• S/390 Multiprise 3000 Enterprise Server
• S/390 Parallel Enterprise Server - Generations 3, 4, 5, and 6
• S/390 Coupling Facilities C01, C02, C03, C04, and C05
• S/390 Multiprise 2000
• S/390 Application StarterPak
• S/390 Parallel Enterprise Servers - Rn1, Rn2, and Rn3 Models
• S/390 Parallel Transaction Servers - E0n and P0n Models

EC J10012 brings the following function to these models:

• Capability to enable Electronic Service Agent. See 1.1.5, “Electronic Service Agent” for additional information about this enhancement.

1.1.5 Electronic Service Agent
Driver 38G provides you with the capability to enable the ITS Electronic Service Agent. Service Agent will provide you with problem analysis and reporting for supported I/O devices as well as access to a number of IBM provided services. In order to enable Service Agent, you will need to order and install the no-charge Service Agent Software product, COMPID 5655-F17. Electronic Service Agent is subject to Terms and Conditions before its enablement. The Electronic Service Agent enablement procedure is detailed in the HMC Operations Guide, SC28-6809.
1.1.6 Miscellaneous Lower Level ECs included in CPC System Code EC J10018 with HMC System Code EC J10016

Following is a list of miscellaneous changes included in CPC system code EC J10018 with HMC system code EC J10016:

Table 1-1. Miscellaneous ECs in DR38

<table>
<thead>
<tr>
<th>EC Number</th>
<th>Name</th>
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</thead>
<tbody>
<tr>
<td>H25080</td>
<td>Backup-DVD New Build &amp; MES Upgrade</td>
</tr>
<tr>
<td>H25486</td>
<td>SUL-DVD (DR38)</td>
</tr>
<tr>
<td>H25078</td>
<td>Security-Log DVD</td>
</tr>
<tr>
<td>H24783</td>
<td>SE Upgrade “Frame Roll”</td>
</tr>
<tr>
<td>H25134</td>
<td>SE Codeload 3X for SE Upgrades</td>
</tr>
<tr>
<td>J10026</td>
<td>HMC Upgrade Diskette</td>
</tr>
<tr>
<td>H24781</td>
<td>SEEPROM MCM/SCM Diskette</td>
</tr>
<tr>
<td>J10185</td>
<td>SCM SEEPROM Diskette</td>
</tr>
<tr>
<td>J10183</td>
<td>6862 FLASH BIOS 56A Upgrade</td>
</tr>
</tbody>
</table>

1.1.7 Input/Output Configuration Program (IOCP) Considerations

1.1.7.1 Standalone IYP IOCP
Stand-alone IYP IOCP Version 1 Release 1 Level 0 (1.1.0) provides support for the zSeries 900.

1.1.7.2 Software Corequisites
See the appropriate 2064DEVICE preventive service planning (PSP) bucket subset ID for APAR and PTF information for the zSeries 900 models.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Preventive Service Planning (PSP) Bucket Subset ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS/390</td>
<td>2064/OS390</td>
</tr>
<tr>
<td>VM</td>
<td>2064VM/ESA</td>
</tr>
<tr>
<td>VSE/ESA</td>
<td>2064VSE/ESA</td>
</tr>
</tbody>
</table>

1.1.7.3 Publications
The following edition of the IOCP publication documents the stand-alone IYP IOCP 1.1.0 release level:

- *Input/Output Configuration Program User’s Guide for IYP IOCP*, SB10-7029-00. This publication is available in the Library section of Resource Link. Check out Resource Link by accessing the URL:

  www.ibm.com/servers/resourcelink
1.1.8 Preventive Service Planning (PSP) Bucket Considerations

Use IBM Service Link or contact your IBM representative to obtain a current copy of the 2064DEVICE, 9672DEVICE, 9674DEVICE, 2003DEVICE, 3000DEVICE or 7060DEVICE bucket applicable to your environment. The PSP bucket contains corequisite software and hardware planning information that applies to various operating system environments. This includes, for example: authorized program analysis reports (APARS), program temporary fixes (PTFs), and Licensed Internal Code (LIC) product patches.