

H3C G5 服务器 NVMe VROC

图形化 BIOS UEFI 启动模式下配置 RAID

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一. 适用范围与注意事项

- 本文档旨在说明 H3C G5 系列服务器通过 Intel VROC 在 UEFI BIOS 下配置阵列的方法，并以 R6900 G5 服务器为例进行配置步骤说明。
- 实际情况是否适用本文档，请通过下面导航链接进行确认：
<https://zhiliao.h3c.com/Theme/details/208527>
- 提示：
 - NVMe VROC 不支持在 Legacy 启动模式下配置 RAID。
 - Intel(R) virtual RAID on CPU 界面可以配置 NVMe 盘的虚拟 RAID 功能。该选项在 Intel VMD 功能未使能的情况下不显示。若 H3C 服务器需使用此功能，请提前安装 Intel NVMe VROC 密钥模块。
 - NVMe VROC Key 支持管理 NVMe U.2 SSD 及 NVMe M.2 SSD，其中安装到 RAID-

MARVELL-SANTACRUZ-LP-2i 的 NVMe M.2 SSD 由该卡单独管理。

- Intel VROC 支持的 RAID 级别与硬盘数量的对应关系请见下表：

RAID 级别	磁盘数量
RAID 0	≥2
RAID 1	2
RAID 5	≥3
RAID 10	4

- 本文档中的信息（包括产品，软件版本和设置参数）仅作参考示例，具体操作与目标需求设置请以实际为准。
- 本文档不定期更新维护，请以发布的最新版本为准。

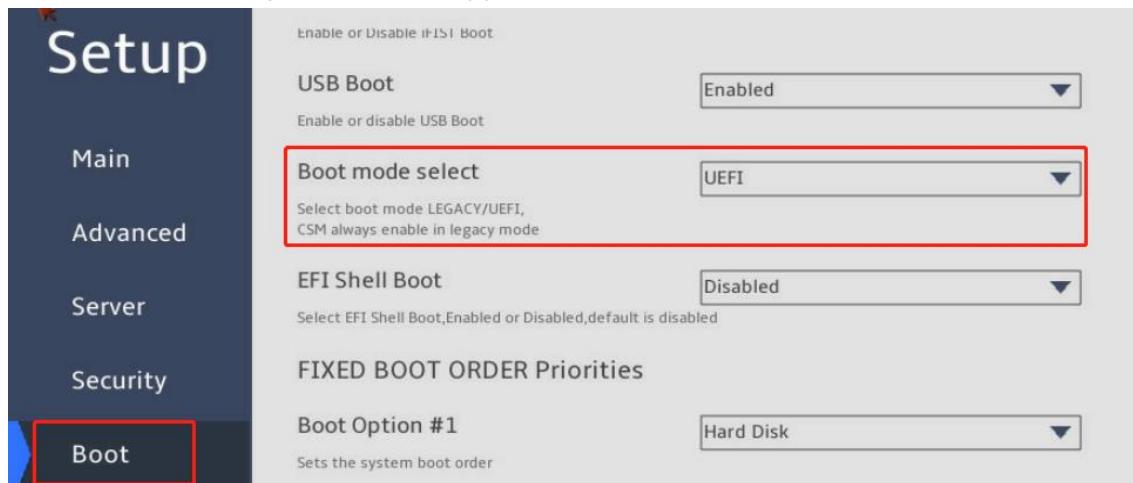
二. 配置准备

- 连接 HDM 与启用远程控制台

具体方法请参考：<https://zhiliao.h3c.com/Theme/details/210144>

- 确认或修改 BIOS 启动模式

在 BIOS Boot 选项中查确认与修改启动模式。



- 启用 Intel® VMD technology

- 在 BIOS 界面依次选择 **Advanced>Socket Configuration>IIO Configuration>Intel® VMD technology**，按 **Enter** 进入。

The image shows the UEFI Setup Utility interface. On the left is a navigation menu with options: Main, Advanced (which is highlighted with a red box), Server, and Security. The main pane displays configuration sections for different processor sockets. A red box highlights the "Socket Configuration" section under Processor Configuration.

Processor Configuration
Displays and provides option to change the Processor Settings

Common RefCode Configuration
Displays and provides option to change the Common RefCode Settings

Uncore Configuration
Displays and provides option to change the Uncore Settings

Memory Configuration
Displays and provides option to change the Memory Settings

IIO Configuration
Displays and provides option to change the IIO Settings

Advanced Power Management Configuration
Displays and provides option to change the Power Management Settings

IIO Configuration

Socket1 Configuration

Socket2 Configuration

Intel VT for Directed I/O (VT-d)
Press <Enter> to bring up the Intel Virtualization for Directed I/O (VT-d) Configuration menu.

Intel VMD technology
Press <Enter> to bring up the Intel VMD for Volume Management Device Configuration menu.

2) 选择 Intel® VMD for Volume Management Device on Processor 1, 按 Enter。



注：根据 CPU 槽位选择。

- 3) 设置每个 **VMD Config for IOU** 及其下的 **VMD port XX-Slot XX** 为 **Enabled**，按 **F4** 保存修改并重启 BIOS 使配置 VMD 状态生效。

The screenshot displays two main sections of the BIOS setup interface:

VMD Config for PCH ports

- Enable/Disable VMD:** Set to **Enabled** (highlighted with a red box).
- PCH Root Port 0:** Set to **Disabled**.
Configuration PCH root port: Enable - VMD ownership root port
- PCH Root Port 1:** Set to **Disabled**.
Configuration PCH root port: Enable - VMD ownership root port
- PCH Root Port 2:** Set to **Disabled**.
Configuration PCH root port: Enable - VMD ownership root port

VMD Config for IOU 4

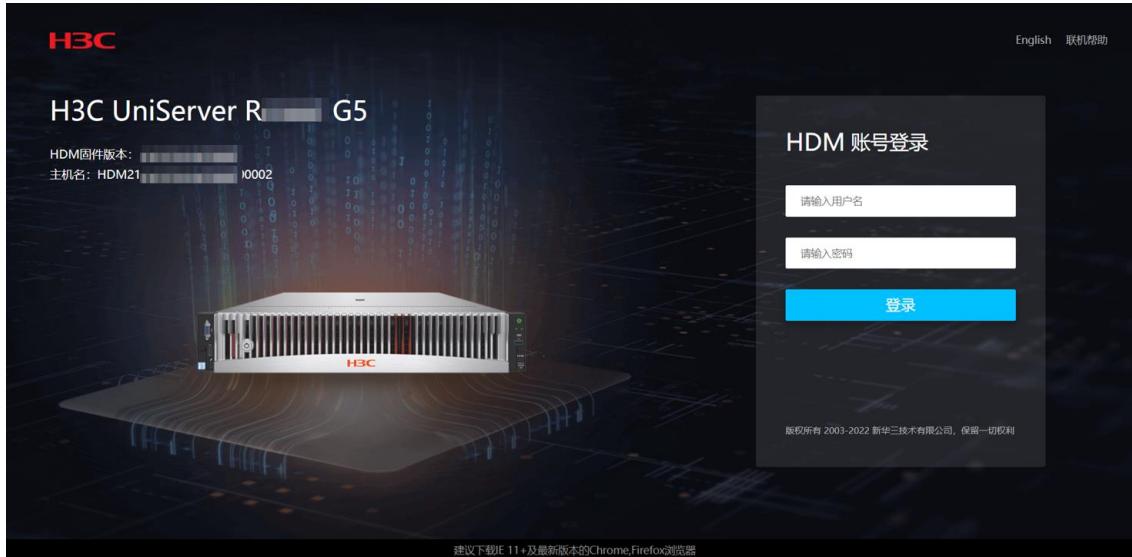
- Enable/Disable VMD:** Set to **Enabled**.
- VMD port 5A - Slot 108:** Set to **Enabled**.
Enable/Disable Intel Volume Management Device Technology on specific root port
- VMD port 5B - Slot 109:** Set to **Enabled**.
Enable/Disable Intel Volume Management Device Technology on specific root port
- VMD port 5C - Slot 110:** Set to **Enabled**.
Enable/Disable Intel Volume Management Device Technology on specific root port
- VMD port 5D - Slot 111:** Set to **Enabled**.
Enable/Disable Intel Volume Management Device Technology on specific root port

注：除对应 NVMe 的 VMD 端口，其余 VMD 端口是支持 PCIe 标准设备的，不建议设置为 Enabled，会导致对应 PCIe 槽位上接入的设备无法识别。

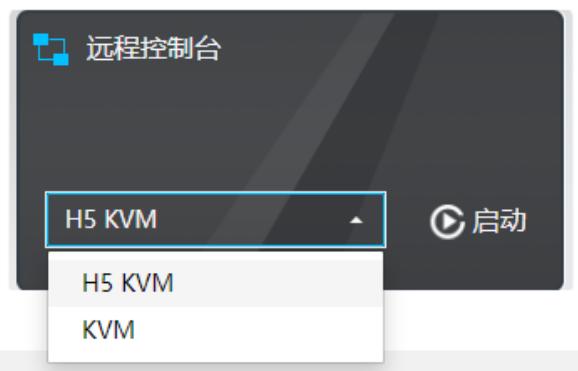
三. 配置步骤

1. 访问 HDM 并启用 KVM/H5 KVM

1) 浏览器输入 HDM IP 地址访问 HDM，输入用户名和密码登录。



2) 选择 H5 KVM 或 KVM 启用控制台。



注：现场同样可使用显示器、鼠标和键盘等外设与服务器进行交互。

2. 创建与删除阵列

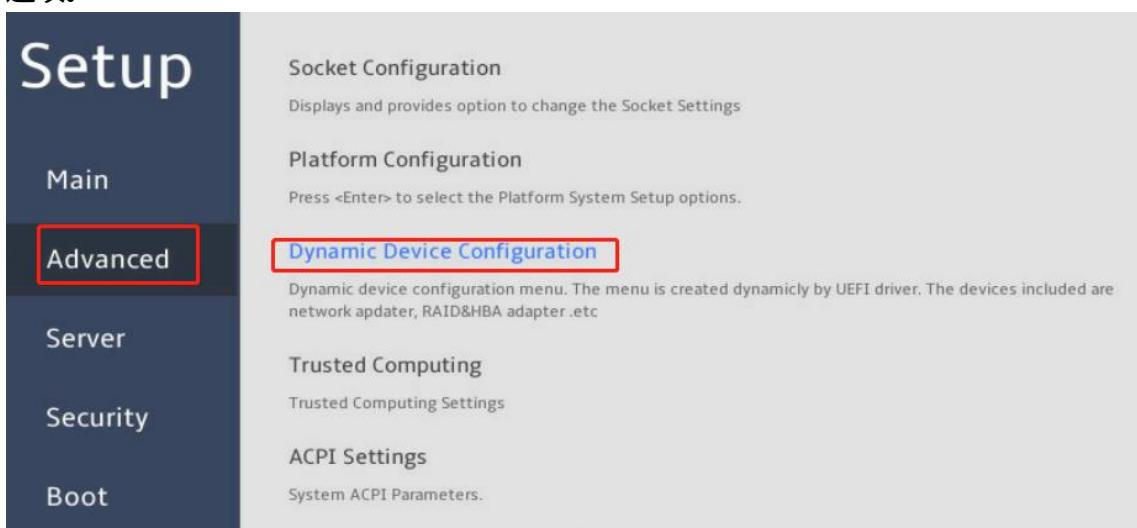
3.1 创建阵列

1) UEFI BIOS 在开机自检界面按下 **ESC**，进入 BIOS 菜单。



- 2) 在 Advanced 页签中找到 Intel(R) Virtual RAID on CPU, 进入并选择选择 All Intel VMD Controllers。

注：在 G5 intel 平台服务器中，如 BIOS 版本更新到 5.71 及以上版本，需要在 Advanced->Dynamic Device Configuration 下找到 Intel(R) Virtual RAID on CPU 选项。



The screenshot shows the 'Setup' interface for 'Intel(R) VROC with VMD Technology 7.6.0.1012'. The left sidebar has tabs for Main, Advanced (which is selected and highlighted with a red box), Server, Security, and Boot. The main content area is titled 'Dynamic Device Configuration'.

- iSCSI Configuration:** Configure the iSCSI parameters.
- Intel(R) VROC sSATA Controller:** This formset allows the user to manage RAID volumes on the Intel(R) RAID Controller.
- Intel(R) VROC SATA Controller:** This formset allows the user to manage RAID volumes on the Intel(R) RAID Controller.
- Intel(R) Virtual RAID on CPU:** This formset allows the user to manage Intel(R) Virtual RAID on CPU.

Intel(R) VROC with VMD Technology 7.6.0.1012

Upgrade key: Premium

No RAID volumes on the system

No RAID volumes were found on the system.

Intel VROC Managed Controllers:

List of all Intel VROC Managed Controllers

All Intel VMD Controllers

Select to see more information about the Intel VMD Controllers

3) 选择 **Create RAID Volume**。

All Intel VMD Controllers

[Create RAID Volume](#)

This page allows you to create a RAID volume

Non-RAID Physical Disks:

List of physical disks on the system that are not part of a recognized RAID Volume

SAMSUNG MZQL2960HCJR-00B7C SN:S63WNE0RB09227, 894.25GB

Select to see more information about the disk

Port 5:0, Slot 108, CPU0, VMD4, BDF 81:00.0

Select to see more information about the disk

SAMSUNG MZQL2960HCJR-00B7C SN:S63WNE0RB09228, 894.25GB

4) 设置 RAID 参数。

Create RAID Volume

Name:

Enter a unique volume name that does not contain space at the beginning or backslash and is 16 characters or less.

RAID Level:

Select RAID Level

Enable RAID Spanned over VMD Controllers:

Enable RAID Spanned over VMD Controllers: For Data RAID only, boot not supported.

Select Disks:

Select Disks:

SAMSUNG MZQL2960HCJR-00B7C

SN:S63WNE0RB09227, 894.25GB

Port 5:0 CPU0 VMD4

X - to Select Disk

SAMSUNG MZQL2960HCJR-00B7C

SN:S63WNE0RB09228, 894.25GB

Port 5:1 CPU0 VMD4

- 5) 在 Name、RAIDLevel、Select Disks、Strip Size 和 Capacity 栏进行相应的设置（参数说明请参见下表），然后选择 **Create Volume**，然后选择 **Yes**，按 **Enter**，完成 RAID 的创建。

参数	说明
Name	RAID 的名称。
RAID Level	RAID 级别，其决定了逻辑磁盘性能、容错能力和容量。
Select Disks	选择组成 RAID 的成员磁盘。Select Disks 栏下方显示了可用的磁盘，按 Enter 选择磁盘， [X] 表示该磁盘已被选中。
Strip Size	条带大小，写在每块磁盘上的条带数据块的大小。
Capacity	逻辑磁盘的容量。

SAMSUNG MZQL2960HCJR-00B7C
SN:S63WNE0RB09228, 894.25GB
Port 5:1 CPU0 VMD4

X - to Select Disk

SAMSUNG MZQL2960HCJR-00B7C
SN:S63WNE0RB09225, 894.25GB
Port 5:2 CPU0 VMD4

X - to Select Disk

SAMSUNG MZQL2960HCJR-00B7C
SN:S63WNE0RB09229, 894.25GB
Port 5:3 CPU0 VMD4

X - to Select Disk

Strip Size: (highlighted by red box)

Strip size help

Capacity (GB): (highlighted by red box)

Capacity is an approximation in GB. Enter desired volume size. 0 will be treated as Maximum Size. Approximate Maximum size=2682.75. Default Capacity is approximately 95% of Maximum size.

Create Volume (highlighted by red box)

Create a volume with the settings specified above

- 6) RAID 创建完成后，会在 RAID Volumes 目录下显示，可查看该 RAID 的详细信息（包括 RAID 名称、级别，所含磁盘信息等）。

Create RAID Volume

This page allows you to create a RAID volume

RAID Volumes:

List of recognized RAID Volumes on the Intel VMD controllers

Volume0, RAID0(Stripe), 2548.61GB, Normal (highlighted by red box)

Select to see more information about the RAID Volume

3.2 删除阵列

在 RAID Volumes 目录下选中待删除的 RAID, 按 **Enter**, 选择 **Delete**, 按 **Enter**, 选择 **Yes**, 按 **Enter**, 即可删除该 RAID。

The screenshot shows a software interface for managing RAID volumes. At the top, it says "Create RAID Volume" and "This page allows you to create a RAID volume". Below this, under "RAID Volumes:", it lists "Volume0, RAID0(Stripe), 2548.61GB, Normal". A red box highlights this entry. Below the list, there's a link "Select to see more information about the RAID Volume". Under "RAID VOLUME INFO", there's a "Volume Actions" section with a "Delete" button highlighted by a red box. At the bottom, it shows the volume details: Name: Volume0, Volume name: Volume0, RAID Level: RAID0(Stripe), RAID Level (type): RAID0(Stripe).

Create RAID Volume

This page allows you to create a RAID volume

RAID Volumes:

List of recognized RAID Volumes on the Intel VMD controllers

Volume0, RAID0(Stripe), 2548.61GB, Normal

Select to see more information about the RAID Volume

RAID VOLUME INFO

Volume Actions

List of actions available for RAID Volume

Delete

Name: Volume0
Volume name: Volume0

RAID Level: RAID0(Stripe)
RAID Level (type): RAID0(Stripe)



3. 创建与删除热备

4.1 创建热备

- 1) 在 UEFI BIOS 中进入 Advanced 页签，选择 **Intel(R) Virtual RAID on CPU**，按 **Enter**。在 Non-RAID Physical Disk 下选择需要配置为热备的硬盘。

注：在 G5 intel 平台服务器中，如 BIOS 版本更新到 5.71 及以上版本，需要在 **Advanced->Dynamic Device Configuration** 下找到 **Intel(R) Virtual RAID on CPU** 选项。

RAID Volumes:
List of recognized RAID Volumes on the Intel VMD controllers
Volume0, RAID1(Mirror), 849.54GB, Normal
Select to see more information about the RAID Volume

Non-RAID Physical Disks:
List of physical disks on the system that are not part of a recognized RAID Volume
SAMSUNG MZQL2960HCJR-00B7C SN:S63WNEORB09227, 894.25GB
Select to see more information about the disk

2) 选择 **Mark as Spare**, 点击 **Yes** 确认。

SAMSUNG MZQL2960HCJR-00B7C SN:S63WNE0RB09227,
894.25GB

Disk Actions:

List of actions available for Physical Disk

Mark as Spare

Mark disk as Spare

Mark as Journaling Drive

Mark disk as Journaling Drive

Mark as Spare

Are you sure you want to mark the disk
as Spare?

Marking disk as Spare will remove all
data on the disk.

Yes

Mark disk as Spare

No

3) 再次点击硬盘查看状态，已显示为 Spare 热备状态。

SAMSUNG MZQL2960HCJR-00B7C SN:
894.25GB

Disk Actions:

List of actions available for Physical Disk

[Reset to non-RAID](#)

Removes RAID data from the disk

[Locate LED](#)

Off ▾

Sends locate led command to a drive

Controller:

Volume Management Device Controller

Controller the disk is attached to

Model Number:

SAMSUNG MZQL2960HCJR-00B7C

Model number of disk

Serial Number:

S63WNE0RB09227

Serial number of disk

Size:

894.25GB

Size of disk in GB or TB

Status:

Spare

4.2 删除热备

- 1) 在 UEFI BIOS 中进入 Advanced 页签，选择 **Intel(R) Virtual RAID on CPU**，按 **Enter**。
在 Non-RAID Physical Disk 下选择需要取消热备状态的硬盘。
注：在 G5 intel 平台服务器中，如 BIOS 版本更新到 5.71 及以上版本，需要在 **Advanced->Dynamic Device Configuration** 下找到 **Intel(R) Virtual RAID on CPU** 选项。
- 2) 选择 **Reset to non-RAID**，点击 **Yes** 确认。

SAMSUNG MZQL2960HCJR-00B7C
894.25GB

Disk Actions:

List of actions available for Physical Disk

Reset to non-RAID

Removes RAID data from the disk

Locate LED

Off

Sends locate led command to a drive

Controller:

Volume Management Device Controller

Controller the disk is attached to

Model Number:

SAMSUNG MZQL2960HCJR-00B7C

Reset to non-RAID

Remove RAID structure on disk?

Yes

Removes RAID data from the disk

No

3) 再次点击硬盘，查看状态已经从热备盘变回未配置硬盘。

Controller:	Volume Management Device Controller
Controller the disk is attached to	
Model Number:	SAMSUNG MZQL2960HCJR-00B7C
Model number of disk	
Serial Number:	[REDACTED]
Serial number of disk	
Size:	894.25GB
Size of disk in GB or TB	
Status:	Non-RAID
Status of the disk	
Block Size:	512

4. 设置与取消直通盘

注：未作 RAID 配置的硬盘可直接被系统识别。