# vKVM Functionality and Usage on OpenVMS

Abhishek K R

## Introduction

The challenges of system administrator positions require that they be on-site and physically present to do their job. However, remote management can help reduce the need for the physical presence of system administrators by providing virtual support, saving time and human resources. Certain remote management features, such as vKVM, also provide virtual devices eliminating the need for procurement of physical devices.

vKVM is an Integrated Lights Out (iLO) integrated console feature that is provided by Lights Out Advanced, and the vKVM acronym is short for virtual keyboard, video, and mouse. The vKVM, also known as the IRC (Integrated Remote Console) feature on the Lights-Out Advanced (LOA) card, enables system administrators to view video output from the managed host where the LOA card is installed, providing a seamless view from the server boot to OS desktop. It also provides keyboard and mouse input to the console from the remote system to the host.
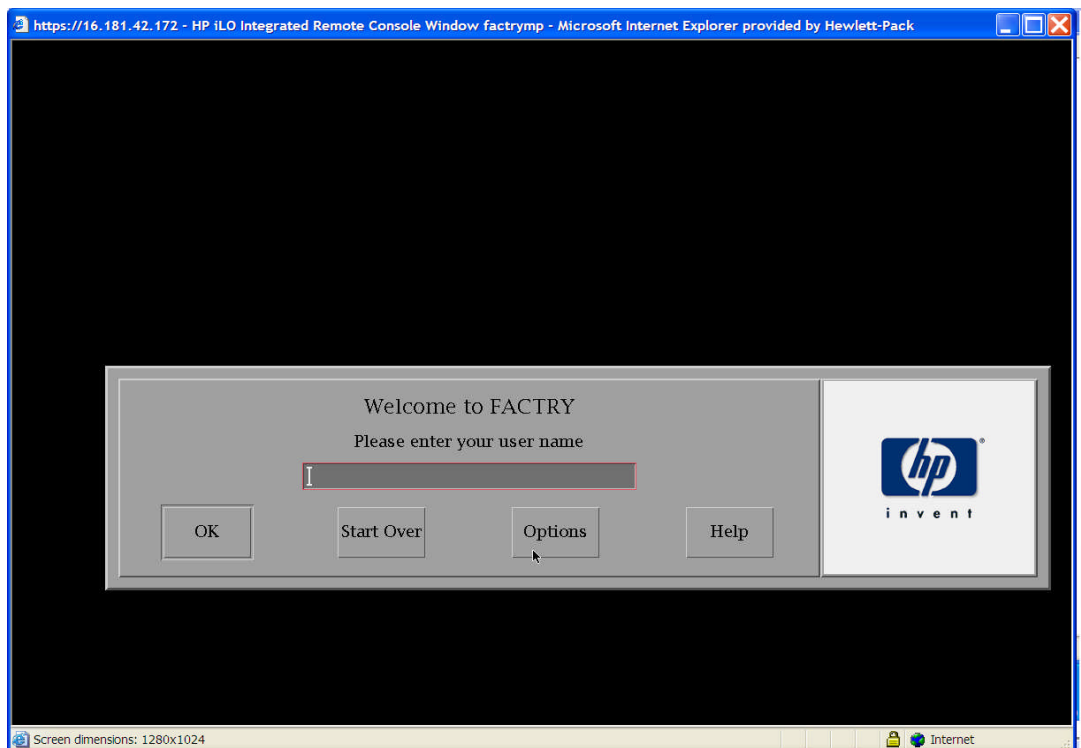
This paper describes the configuration and usage of vKVM on OpenVMS.

## What is vKVM?

vKVM is a USB keyboard and mouse implemented in firmware by the management processor, which is designed to allow a remote user to control the system as if they were using VGA monitor and keyboard directly attached to the local system.

vKVM allows a remote PC to display the contents of a built-in graphics card on both the X11 and VGA consoles. Integrated console functionality allows pre-boot (EFI), OpenVMS boot, and runtime (both text console and DECwindows) to be displayed and interacted with from the iLO browser window.

DECwindows and the graphics console can be accessed and controlled from a remote Windows PC, which has a browser and can connect to the iLO webpage of the server. The output of the DECwindows screen will appear on a Windows server as shown:

The keyboard and mouse attached to the Windows server can be used to control the DECwindows screen and perform operations as and when required.

## Why is vKVM required?

Physical access to the server has always been an issue due to security reasons. When performing GUI-based testing, an administrator's physical presence is required in front of the monitor to see the output and control the tests. As everything else can be controlled remotely, why not include graphics as well?

If there are multiple blades in an enclosure, there will be no reduction in the number of monitors, keyboards, and mice required to control and visualize the graphics. Even though the space required by the servers has been reduced, the space needed for accessories is not decreased.

vKVM helps to solve these issues.

## Advantages of vKVM

- The server graphics console can be viewed and controlled just as if you were standing in front of the remote server. It is not necessary to be physically present in front of the monitor connected to the server to control the mouse or the keyboard. The mouse and keyboard connected to the remote Windows server can be used to control the input.
- The server can be accessed from any location on the same network.
- A controlled reset of the server, regardless of the state of the host operating system, should remain connected to monitor the reboot process. The EFI shell, VGA console and DECwindows screen can be controlled from the remote server.
- Multiple keyboards and mice connected to the server work on DECwindows and can be used to control the inputs to the server.
- vKVM works with a standard browser and no additional software is required on the remote server or client system.
- Multiple browsers can be opened to monitor multiple servers, which eliminates the need for multiple monitors.
- The data stream is encrypted, enabling secure monitoring and management of the server.

## Prerequisites for vKVM

For Integrity entry-class servers, the advanced features are enabled with a license key. For Integrity cell-based servers, the advanced features are enabled with a PCI-X accessory card instead of a key.
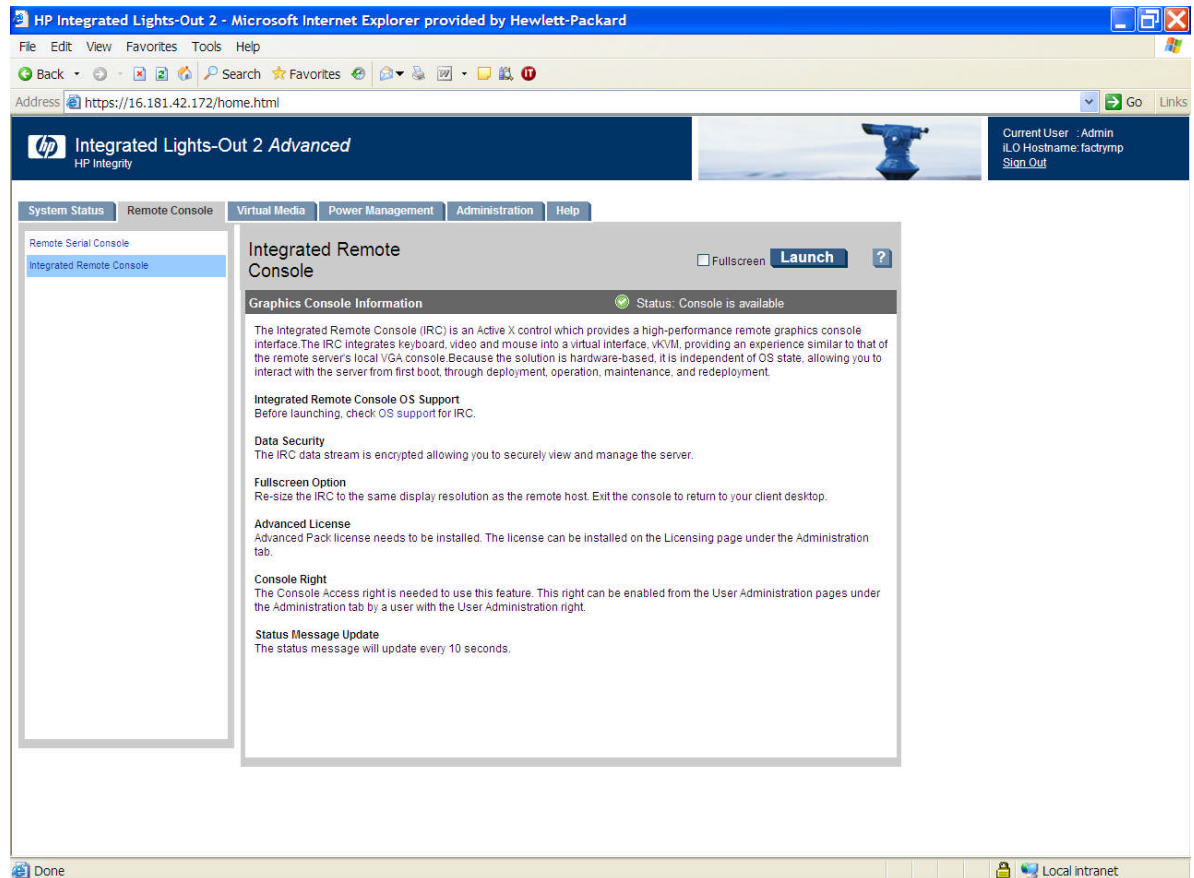
The Integrity Lights-Out Advanced (LOA) or KVM card is an optional accessory which combines a physical graphics or USB card with additional logic to enable the Lights-Out Advanced features of Virtual Media and Integrated Remote Console.

vKVM is supported on Windows clients running Internet Explorer 6.0 SP1 (minimum configuration).

Download and usage of signed ActiveX controls must be enabled. The IRC runs as an ActiveX control that is downloaded to Windows clients. The ActiveX control automatically downloads from iLO 2 on the initial client connection.

## Steps to use vKVM

1. Open the Internet browser and enter the console IP address in the address bar.
2. Enter the login credentials for the console.
3. Click **Remote Console**.
4. Click on the **Integrated Remote Console** link on the left side of the web page.



5. Click **Launch**.
6. To view the display in full-screen mode, select **Full Screen.**
   A new pop-up window appears with the DECwindows login screen.

## Support in OpenVMS for vKVM

If vKVM is supported on the server, DECwindows will start without any keyboard and mouse attached to the system. (Earlier versions of OpenVMS had to wait for the keyboard and mouse to be connected to the server before DECwindows was started.)  From OpenVMS Version 8.4 onwards, DECwindows starts automatically without any keyboard or mouse needing to be attached to the server.

As a result of changes for vKVM, additional devices will be displayed (e.g., KBX0, MOX0, KBD0, MOU0) on OpenVMS.

- The KBX0 and MOX0 are dummy devices that are used by OpenVMS.
- KBD0 and MOU0 are virtual keyboard and mouse, respectively, provided by the firmware used for vKVM.
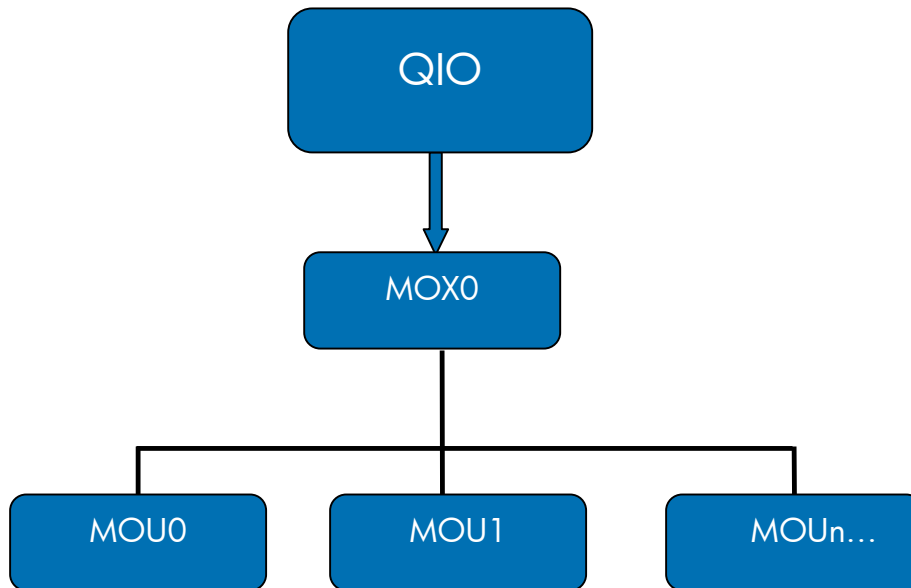
The input from the Windows server will be routed through these devices and the appropriate changes will be reflected on the screen.

This will also change the way QIO's are performed on keyboards and mouse devices.

For example, the following command will switch the middle and right buttons of all the mouse devices attached to the server:

```
DECW$CONFIG>SET BUTTON_MAP MOX0 0 1 4 5 2 3 6 7
```

This can be done because MOX and KBX devices are dummy devices that are used to direct the output to all the input devices attached to the server. If there are multiple mouse devices attached to the server, any operation done on MOX device will be fanned out to all the related devices (MOU1, MOU2, and so on), as shown below.

```
        ┌─────────┐
        │   QIO   │
        └────┬────┘
             │
             ▼
        ┌─────────┐
        │  MOX0   │
        └────┬────┘
             │
   ┌─────────┼─────────┐
┌──────┐  ┌──────┐  ┌──────┐
│ MOU0 │  │ MOU1 │  │ MOUn…│
└──────┘  └──────┘  └──────┘
```
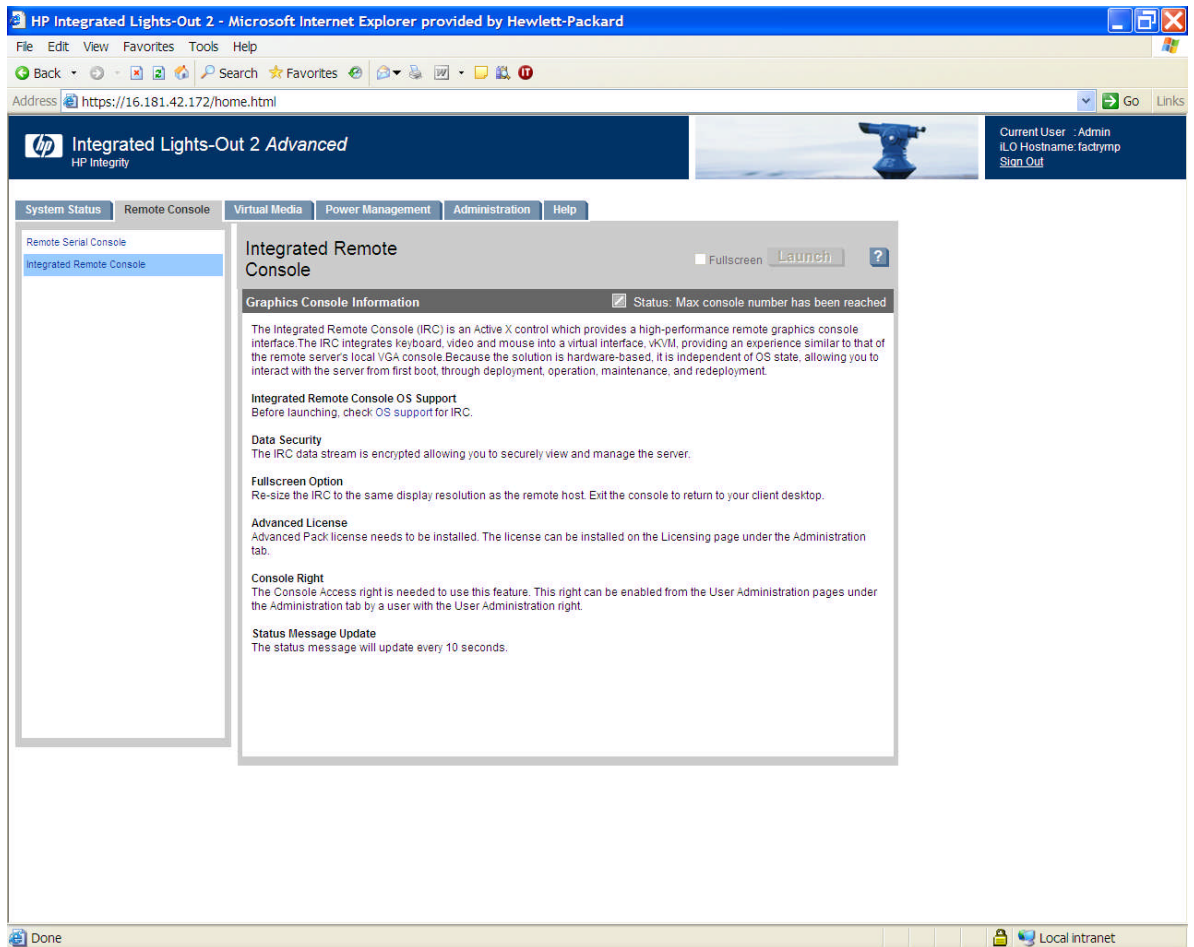
If an operation has to be performed on a specific device, the device name has to be mentioned in the command as shown in the command below:

```
DECW$CONFIG>SET BUTTON_MAP MOU2 0 1 4 5 2 3 6 7
```

## Troubleshooting

Before starting vKVM, verify the following:

- Verify whether vKVM is available. Only one user can control the IRC at a time. If a remote console session already exists on the system, you are notified that IRC is unavailable. To determine if the vKVM or IRC is available, click the **Integrated Remote Console** link. If **Launch** is grayed out and the maximum console number has been reached, the following status message appears: "The remote console/IRC is in use by another client."

- Verify that you have console access permission on the **User Administration** page, or if that right must be granted.
- Verify that the system is licensed for IRC use. To view this information, go to **Administration Licensing** tab.
- Disable any pop-up-blocking applications, which prevent IRC from running.
- Verify that the resolution of DECwindows is set to 1024 X 768 or below.
- Some key combinations might not work as expected. For example, the auto-repeat key functionality cannot be disabled or enabled on the remote keyboard. All the limitations with the key combinations are limited to the remote mouse and keyboard and not to locally attached devices.
- Multihead display will not be transported over the network. The display from the onboard graphics card will be transported over the network and will be available at the remote Windows server.
- The list of supported browsers are available at http://www.hp.com/go/integrityilo.

## Conclusion

The vKVM solution assists DECwindow customers by enabling remote access to OpenVMS desktop from any location, thereby eliminating the requirement to be physically present at the servers.