CVB GEV Server a quick peek

What is CVB GEV Server?

GigE Vision™ Server (GEV Server) allows any Common Vision Blox (CVB) acquisition source such as a frame grabber, USB camera or image from memory or disk to be presented as a GigE Vision compliant image stream. The GEV Server can be used in many situations ranging from simple long distance image delivery over standard network infrastructure to extremely complex multiple camera / multiple client installations.

The first example to look at is possibly the simplest use of the GEV server: using one camera (of any technology), a server PC and a client PC. This setup will simply acquire images on the Server, and transfer them to the client.

Setting this sample up using the CVB GEV server can be as simple as assigning an image to the tool, and starting the GEV Server. As an illustration of this the following 4 lines of code creates a GEV Server, assign an image to server, selects an IP address for the GEV Server to use, and launch the server. There is no need to have a deep understanding of GenICam XML (Generic Interface for Camera) as this is all created by the CVB GEV server.

```
// create server
GevServer server = new GevServer();
// assign driver
server.Image = driverImage;
// get first available IP and start
IPAddress firstIP = GevServer.GetInterfaceList()[0].IPAddress;
server.Start(firstIP);
```

At this point any GEV compliant software on a client PC would be able to discover, connect to and start the image data transfer from the GEV Server's PC. This very simple example could easily be extended to allow multiple clients to connect to multiple different cameras. And then the question might arise - do we need Unicast or Multicast?

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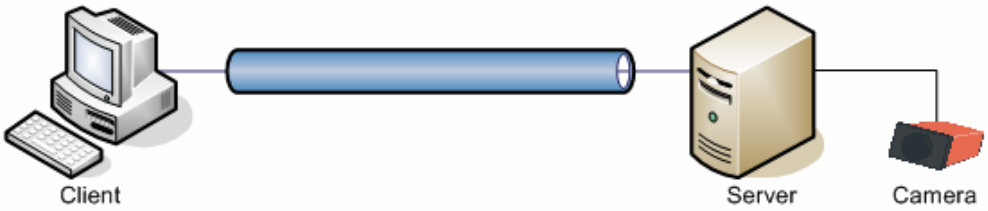
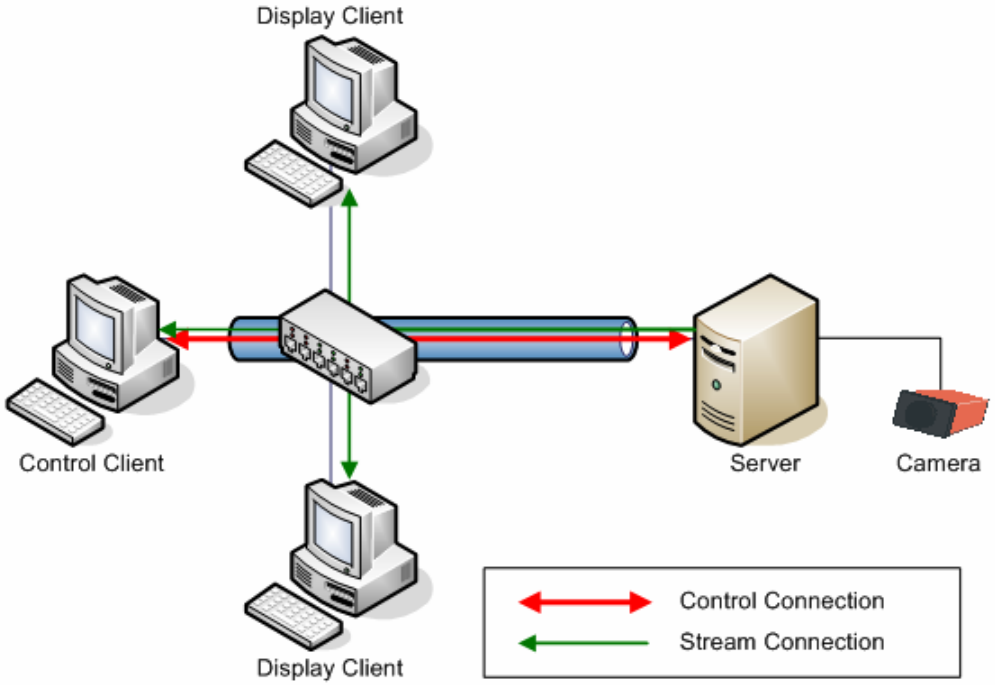


The example above demonstrates a simple Unicast setup, one server and one client. In this scenario there is a one-to-one relationship between server and client. The client controls the server and receives the image data. Normally the Control Channel Privileges in this topology are set to exclusive, which means that only the controlling client has read and write access to the server.

N.B. Control Channel Privileges define how the client wants to access the Camera or in this case the GEV Server, there are three choices Read Only, Control and Exclusive.

As a second example, consider multiple clients having access to multiple different cameras. In this case we could still use unicast communications, but this has the implied limitation that only one client can access any one camera at a time, due to the clients and server using a peer to peer connection. To over come this and allow any client to access any camera at any time we need to bring in multicasting.



The now somewhat simplified diagram shows three client systems, one server one camera, and one switch. With GEV there is always one, and only one, controlling client. This means that even in a multicast scenario there must be one client PC which controls the server, and this client PC holds the control connection, i.e. it has the control channel privileges set to Control.

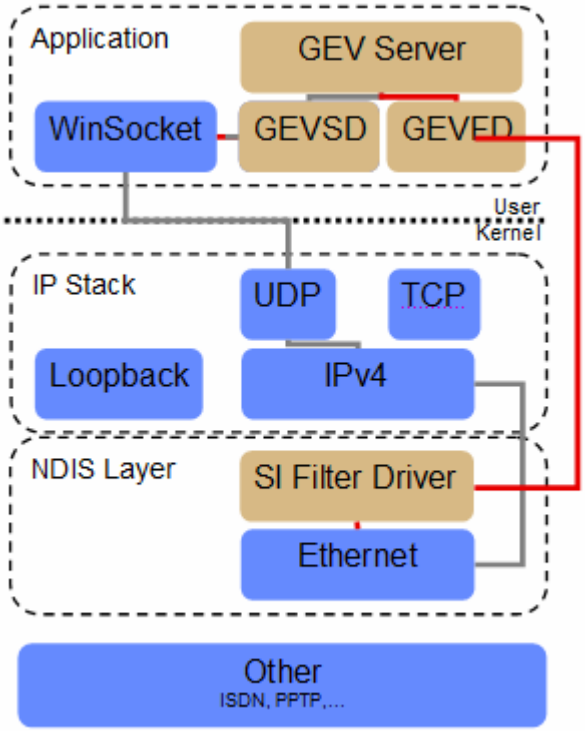
In the illustration above this would imply that as long as the control client has opened the connection and started the acquisition on the camera then two display clients will also be able to receive the Image feed.

As a side note on the simplicity of GEV Server, the short code example at the start of this tech tip is still relevant in this more advanced setup, with the clients deciding how they need to connect to the server, rather than the Server deciding how the clients must connect.

It is worth mentioning at this point that multicasting is a relatively advanced form of network connection, and it is worth having a good understanding of network architecture before attempting to use it. But, simply put, the switch used must support multicasting and must have multicasting enabled and configured for the network, because it will be the switch which routes all the data to the clients.

Another advantage of using CVB GEV Server, other than flexibility of the acquisition source and the simplicity of use is the efficiency of the driver. The GEV server is based on the well established CVB GEV Filter Driver. The Filter Driver allows very efficient communication by effectively by-passing the IP stack, thus reducing the number of user/kernel mode transitions (relates to CPU time), whilst minimising the impact on other network communications.

CVB also has a GEV Socket Driver. The Socket Driver routes all communications through the IP stack and therefore requires much more CPU time than the Filter Driver, although it does allow for Loop-back communications. This can be very useful for setting up a test on a development system, as it means the Server can effectively serve data to its self and emulate a camera that is required by the developer this coupled with the ability to emulate virtually any feature that is required makes this a very powerful tool.



GEV Server is a standard CVB tool with extraordinary capability. If you would like to learn more then please contact us for further information.

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