

Accessing HART Devices Using OPC

The principle objective of the HART OPC Server is to act as a transport mechanism for communicating with HART devices. The interface via the Server to the device is the same whether the device is connected directly to the PC or connected via some intermediate I/O system. While the intermediate I/O systems may vary, the interface to applications using the OPC server remains the same. Using the Server significantly simplifies access HART compatible field devices because:

- No HART Master Link Layer needs to be developed;
- Addressing and communication details are handled by the Server;
- Support for many multiplexer and I/O systems are automatically included, no special software or code is needed by the application; and
- Access to the field devices is shared. In other words, many client applications can access HART data from the same device or several different devices simultaneously.

The OPC interface complies with Revision 1 of the OPC Foundation Specifications. OPC allows a client to access "named data items". These "named data items" are defined by an OPC compatible server. Basically the OPC Client "Browses" the named data items provided by the server and *Subscribes* to the data item of interest (see Figure 1). These data items can be grouped and the group turned off and on by the client. When a group is turned on the server will *Publish* the data items based on the criteria set by the server. These criteria include update rate and dead band. This allows the client, for example, to only get the data item when it changes.

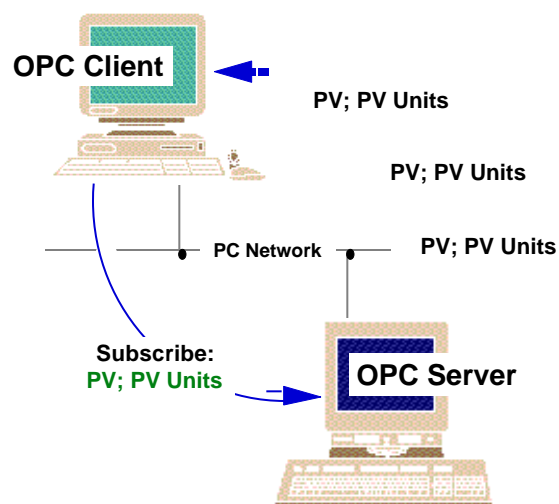


Figure 1 OPC Client Server Operation

The HART OPC Sever provides access to all Universal and some Common Practice Command data items (see Figure 2). This support provides system integrators with an interoperable and common look for all HART compatible devices. The named data items can be organized into 5 different blocks of data:

- The Process Connections data items all characterize the process directly. These data include the Primary, Secondary, Tertiary, and Quaternary process variables.
- The Range Calculation and 4-20mA Connections are data supporting the field device's connection to the 4-20mA current loop. Upper and Lower Range values can be both read and written which allows the field device to be re-ranged from an OPC client.
- Device Information is accessible and the Message and Descriptor fields can be read or written from an OPC client.
- Device Status information is available to OPC Clients. Since device status is read on every HART transaction the OPC client is provided continuous assurance of field device's operating condition.

Since the name data items includes the cyclical process data the Server meets the needs of most SCADA, process monitoring, and simple control applications.

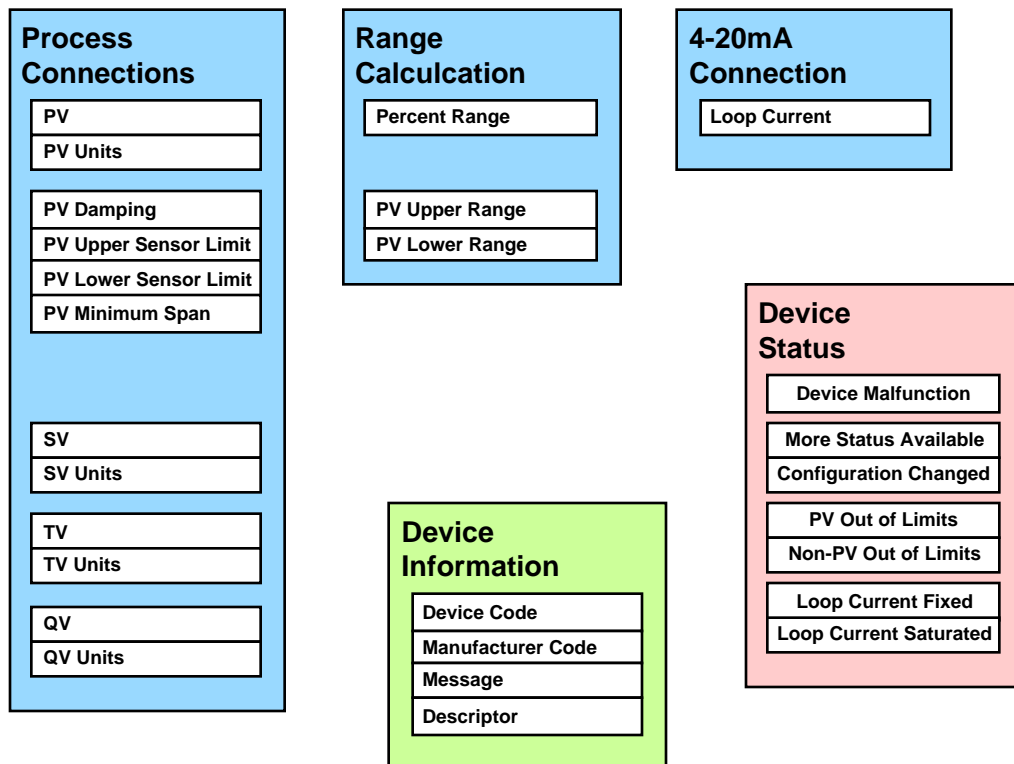


Figure 2 HART OPC Named Items

The "Tag" is not included as a named data item because it is used to identify the field device itself. If you will the Tag is the name of the field device. In fact, the OPC Specifications use the tag to connect to and access field device data. Furthermore each element in the communication path contains a tag as well so there are tags for the network, multiplexer and field device (see Figure 3). When the tags are concatenated together for the network, multiplexer and field device the unique communication path from the server to the field device is created. This combination allows the server to support simultaneous access to a large number of devices:

- Each server installation may have several networks. For example, each serial port on the PC could be a network of multiplexers. In addition, there may be other I/O systems connected to an Ethernet or token ring card as well.
- For each network there can be several multiplexers or I/O systems.
- There can be numerous field devices connected to each multiplexer.

The connection to the named data item is established by allowing the user to browse through the networks, multiplexers and field devices. This browse function is implemented in one way or another by all OPC Clients. Figure 3 shows a sample browse screen that the user may see. In this example there are two networks. On the first network there are three multiplexers. In addition, the second multiplexer has two sub-panels.

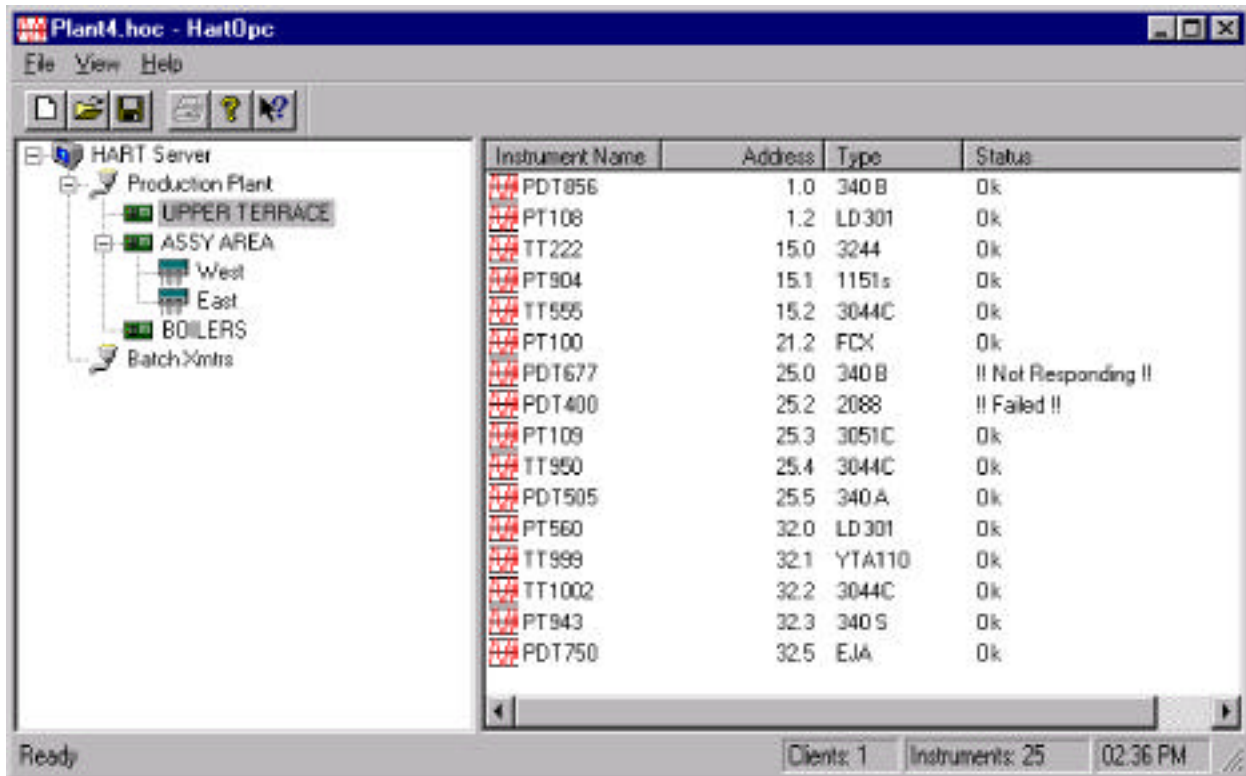


Figure 3 Browsing the Field Devices Connected to a HART OPC Server

Access to the device is associated with the tag string for the device. This is the communication path to the field device. Each network, multiplexer and the device's tag is separated by a dot (.). For example, the path used to access the "PV" for the Moore Products 340S in Figure 3 would be

"HART Server.Production Plant.UPPER TERRACE.PT943.PV"

Of course you may never see this string because Most OPC Clients just let you double-click on the item you want to subscribe to. Then the OPC Client sends the string directly to the OPC Server when subscribing to the data item. You just start getting the data need for you application. Accessing HART compatible field devices has never been easier or less expensive. As your HART supplier about getting a copy of the HART OPC Server!