**Redundancy: Client/Server Architecture**

In order to share information among workstations, VTScada uses a client/server architecture where a system of workstations running the same VTScada application exchanges data. In typical client/server architecture, the server workstation is responsible for providing information to all of its client workstations.

For a VTScada application to run on several computers, sharing data and tasks between them, one computer must be designated as the server. You should also designate backup servers in the event that your primary server fails. VTScada also allows you to designate primary and backup server lists for many different services, such as logging, alarms, modems, etc. but this level of configuration is optional. Once you have defined at least a primary server and have done a “get from server” to install the application on other computers in your network, you have a remote application.

Client workstations are those that are not currently serving as a primary server while running a remote application.

**Networking - The Single System Approach**

VTScada supports any number of networked workstations using the TCP/IP communications protocol. Any standard VTScada system can take advantage of new workstations without requiring additional configuration work. Systems can therefore be expanded with minimal effort. Full multiple hot-backup with automatic switching is also supported.

VTScada supports a client/server architecture with the ability to set multiple servers for any given task and set different servers for different tasks. For example, the I/O drivers are typical servers. Any workstation may be a client or server for the driver. A client will receive data from the server via a TCP/IP socket connection. A server workstation will access data directly from the I/O device and make it available to any client workstation that wishes to receive this data. A client workstation will also act as a server to another client if required. If the server fails for any reason, each client may have a list of alternative workstations to use as backup servers.

**Server Redundancy**

Server redundancy means that, if a primary server is unavailable due to a power outage, network connection loss or other failure, a designated backup takes over and enables the application to continue to run. This applies to both configuration servers and service servers. Backup servers behave as clients until their designated primary fails. If the primary server fails, the first workstation to be designated as a backup server immediately takes over the primary’s role, enabling the application to continue running until the primary server is back online.

**Example**

Given 3 workstations:
- Primary configuration server A,
- Backup server B, and
- Client C.

While A is online, B and C operate as clients of A. (right)

If A shuts down, B immediately assumes the role of server. C is now a client of B.
Server Redundancy - Continued

When the primary server restarts, it synchronizes all application and data files with the backup server, and then reassumes its role as primary server, while the backup server resumes its role as a client of the primary server.

In our example, as A restarts and the VTScada application begins to run, A looks for a server where it can get a copy of the most up-to-date data. A acts as a client to B, and synchronizes its application data and files with server B. (be-low left)

Once synchronized with B, A's internal synchronization mode instantly drops to 0, and A and B reverse roles; A becomes the primary configuration server, and B is once again a client to A. (above right)

In the event that client C is communicating with B while B is acting as the backup server, and a switch of servers occurs (i.e. the primary server comes back online), client C switches to A and synchronizes its application data and files with those on A.

In other words, each time a server changes, all clients resynchronize their application data and files with the server.

If the primary configuration server and the first backup server fail, the second workstation to be designated as a backup server assumes the role of server.

The process used by VTScada to provide server redundancy is illustrated by the diagram on the right.

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