

Back Office Server Software Package

Connecting to the Simplex Remote Telemetry Gateway



Application Note

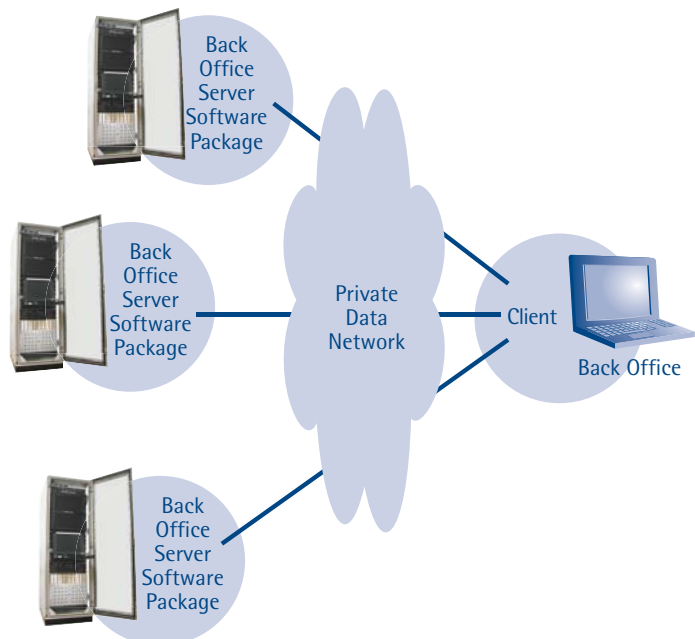
Providing remote access from the Back Office to remotely deployed software defined radio systems for secure data transfer, event notification and administration.

Your Challenges	Spectrum's Solution
Do you face any of these challenges?	Spectrum's <i>flexComm</i> ™ Back Office Server Software Package can help you overcome your challenges:
Security	
<ul style="list-style-type: none"> Protecting your clients' sensitive beacon data from unauthorized access 	<ul style="list-style-type: none"> Securely access remote data via Client/Server virtual private network connectivity with customized data packet format. Custom payload encryption is available.
Reliability	
<ul style="list-style-type: none"> Ensuring that quality of service levels are exceeded 	<ul style="list-style-type: none"> Access system performance and status logs via HTTP or FTP interface.
<ul style="list-style-type: none"> Minimizing system downtime to maximize revenue 	<ul style="list-style-type: none"> Obtaining real-time fault notification through an SNMP based interface that provides access to minor, major and critical alarms that are cued by a background built-in-test task that monitors status of hardware and performance of system.
<ul style="list-style-type: none"> Reducing operational costs through centralized maintenance 	<ul style="list-style-type: none"> Troubleshoot remote systems as though you were co-located with them. Enables you to run all applications including all supported development tools.
<ul style="list-style-type: none"> Ensuring data retention in the event of network failure 	<ul style="list-style-type: none"> Capacity for months of payload data transactions that can be automatically forwarded once the network is restored, providing tolerance for network interruption.
Administration	
<ul style="list-style-type: none"> Reducing operational costs through centralized asset management 	<ul style="list-style-type: none"> Message traffic and system status is collected from systems across many sites and forwarded to a central location via the Internet.
<ul style="list-style-type: none"> Reducing costs of upgrading remotely deployed gateway systems 	<ul style="list-style-type: none"> Upgrade and reconfigure remotely located assets via FTP and HTTP interfaces.

Description

The *flexComm* Back Office Server Software Package is a server-side application that provides client/server access to each *flexComm* Simplex Remote Telemetry Gateway, enabling data access, status logs, fault notification, configuration and software upgrades. This solution is ideal for satellite communications providers with geographically dispersed gateways.

For more information on the Simplex Remote Telemetry Gateway, please visit www.spectrumsignal.com or contact Spectrum Sales.



[Secure Data Access]

The Back Office Server Software Package runs on the Simplex Remote Telemetry Gateway Receiver. Remote telemetry data is transmitted from a beacon, reflected at the low Earth orbit (LEO) satellite and received at the Gateway. The Simplex Remote Telemetry Gateway demodulates the telemetry data messages and makes it available to the client/server network interface. If the network interface connection is interrupted, the messages are stored and forwarded once the connection is reestablished. The messages are logged for at least 30 days and can be downloaded via the FTP interface. The messages consist of the payload, GPS time of reception and satellite beam of reception.

[High Availability]

To maintain high availability, a built-in-test process that runs in the background constantly monitors the system performance. The Back Office Server Software Package provides system status through HTTP and SNMP alarms. Additional status information, such as packet loss over the satellite link, interruptions in network connectivity and startup/shutdown requests, are logged and downloadable from the server.

[Remote Debug]

Remote troubleshooting and debugging are essential for detecting and resolving unexpected, undesirable system performance. The Back Office Server Software Package enables remote troubleshooting and debugging by logging events, collecting test point data and allowing a remote connection.

[Software Defined Upgradability, Configuration and Control]

One of the key advantages of a software defined radio (SDR) system is the ability to easily upgrade or modify the software to improve its performance or to change its personality without altering the hardware. The Back Office Server Software Package exploits this benefit, enabling upgrades from a remote operator location. New software and firmware upgrades are uploaded to the system via the FTP interface and an upgrade sequence is initiated via the client/server interface.

Remote configuration and control are also performed using the HTTP interface.

Architecture

The Back Office Server Software Package provides four network interfaces to a client as shown in Figure 2. These interfaces are discussed in detail below.

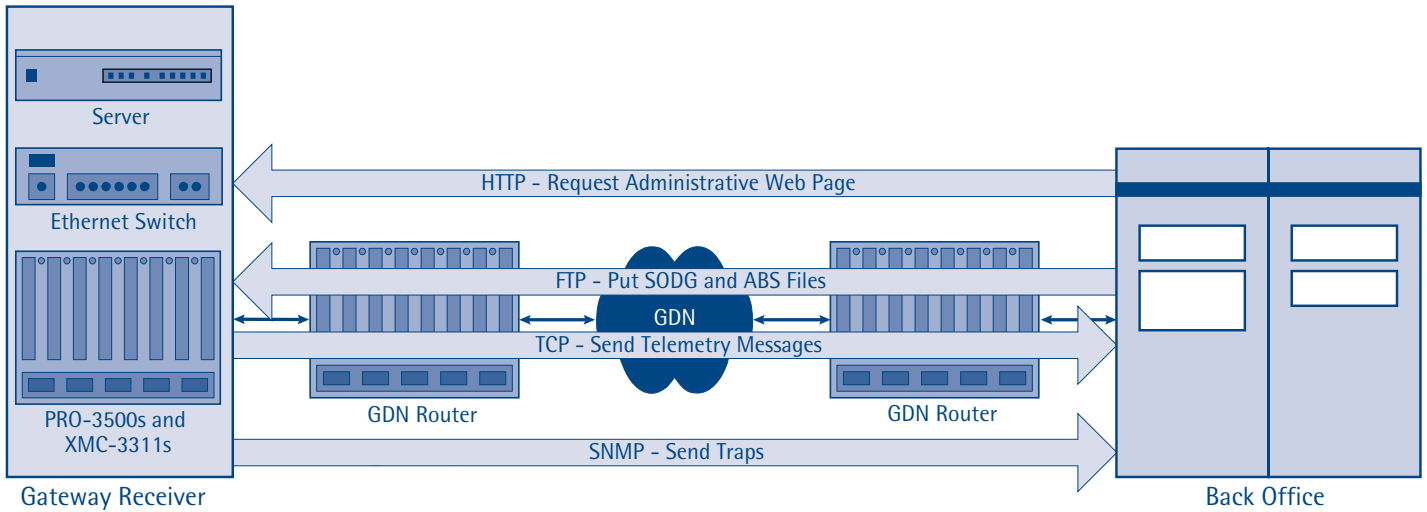


Figure 2. How the Back Office Server Software Package connects to the Simplex Remote Telemetry Gateway Receiver

[TCP – Transport Control Protocol]

The Back Office Server Software Package provides client access to the physical layer waveform and system controller software. The waveform's physical layer demodulates and provides the message data extracted from each beacon signal. A TCP socket connection then streams the beacon message data from the Simplex Remote Telemetry Gateway Receiver to the back office client. The message format is defined in an Interface Control Document (ICD). The message format is software defined, and may be modified if additional information is required.

[HTTP – Hyper Text Transport Protocol]

The Back Office Server Software Package incorporates an Apache Web Server application in order to serve web pages to the back office. This web server uses HTTP protocol to support the following administrative functions:

- Request the Gateway Receiver to create a log file and to start/stop recording of:
 - self-test diagnostics logs
 - signal details logs
 - debug logs
- Request the IP address of the Gateway Receivers
- Request date and time of the Gateway Receiver system
- Request software versions and firmware versions of the hardware in the Gateway Receivers
- Request the current uptime for the Gateway Receiver servers
- Command the Gateway Receiver to reboot
- Upload new software/firmware files to the Gateway Receiver radio
- Upload new software to the Gateway Receiver server
- Command Gateway Receiver to send system alarms via SNMP to a specific IP address

[FTP – File Transfer Protocol]

The Simplex Remote Telemetry Gateway Receiver uses antenna beam schedule (ABS) files and satellite orbit data at the gateway (SODG) files that are uploaded via the FTP interface. These files provide the temporal geometric information required to estimate downlink Doppler characteristics and to bracket the uplink Doppler range at a certain time per day per beam. These values are used to compensate for satellite Doppler, minimizing the Doppler range and improving the performance of the gateway's demodulation algorithms.

Waveform, control and server upgrade software may be uploaded via the FTP interface. Initiation of the upgrade is performed via the HTTP interface. The Simplex Remote Telemetry Gateway Receiver debug status information and log files may also be requested via FTP.

[SNMP – Simple Network Management Protocol]

The Gateway Receiver incorporates online diagnostics in the software and firmware that monitor system status. The output from these diagnostics comes in one of two forms:

- Significant events that define functional issues that have already, or may soon interfere with normal operation of the Gateway Receiver
- Alarms that define equipment malfunctions

The Gateway Receiver notifies the back office client of any alarms or significant events via SNMP traps (asynchronous SNMP notifications). This method allows the back office client to be interrupted when a change in the system occurs at the Gateway Receiver that could potentially impact operation.

Alarms and events are also written to a log file for future retrieval. The log file serves as a back-up in case the Gateway Receiver loses power after an alarm or event occurs but before a trap can be sent to the back office. A timestamp is recorded against events and recorded in the log file.

[More Information]

For more information, please also see the Simplex Remote Telemetry Gateway Receiver Application Note.