Scatter–Gather I/O

Scatter–gather is a Windows I/O capability that enables I/O transfers to or from a set of non-contiguous memory locations as if they were contiguous. Win32 exposes this capability through `ReadFileScatter` and `WriteFileGather` functions. The Windows Sockets library also supports scatter–gather through its own functions: `WSASend`, `WSARecv`, as well as others.

Scatter–gather is useful in the following scenarios:

- You have a fixed header prepended to the payload of each packet. This saves you from copying the header each time to make a contiguous buffer.

- You want to save on system call overhead by performing I/O to multiple buffers in one system call.

Although `ReadFileScatter` and `WriteFileGather` are limiting because each buffer must be exactly of system page size and the functions require that the handle be opened as overlapped and unbuffered (which imposes even more constraints), socket-based scatter–gather is more practical, because it does not have these limitations. The .NET Framework exposes socket scatter–gather through overloads of `Socket`'s `Send` and `Receive` methods, but the generic scatter/gather functions are not exposed.

An example of scatter–gather usage is by `HttpWebRequest`. It combines an HTTP header with the payload without constructing a contiguous buffer to hold both.