

Packetized Data Transmission

Customer Need:

Softsmith has provided a customized solution to address packetization of data and transmit the same in a low bandwidth scenario to its customers. There are 2 different needs for a customer. Data stored in PDAs must be encrypted, compressed and packetized before sent to server. The PDAs may have a low or high bandwidth connectivity. The application has some components in ships (vessels) and those components interact with centralized controller systems. Connectivity between vessels and land is very limited and hence data transmission is a costly operation.

Program Units and Operations:

PDA to server:

- The PDA user can choose specific data to be sent to the server.
- The PDA user can specify the packet size as 1KB, 2KB, 4KB, 8KB based on signal strength or bandwidth at that place.
- The PDA user can specify the number of retries if send fails.
- PDA user can provide a specific private key for encryption of data.
- PDA user can specify the time at which the packets to be sent.

Vessel to Land:

- The vessel user can choose specific data to be sent to the server.
- The vessel user can specify the packet size as 200B, 400B, 800B, 1KB based on signal strength or bandwidth at that place. Vessel communication is very costly.
- The vessel user can specify the number of retries if send fails.
- Vessel user can provide a specific private key for encryption of data.
- Vessel user can specify the time at which the packets to be sent.

Though the problems are same, the development medium was different. For PDA, Softsmith provided embedded VC++ solution and for the vessel application, Softsmith provided a C# solution. But the logic remains the same in both business cases.

Key Test Areas:

The following list describes the key test areas, under which a set of tests were conducted to ensure quality.

- Testing the transaction using different bandwidth as configured
- Device going out of range from server while data transfer is in progress
- Data transfer tests under various signal strengths
- Data transfer resume tests
- Packet loss tests and resumption tests
- Data encryption tests (custom encryption is used by the application)
- Data volume tests when huge amount of data is transferred from client to server for hours together
- Simultaneous data transfers from multiple clients to the server
- Data corruption tests (bad XMLs)
- Resource usage tests on devices – cpu, memory etc.
- Crash tests when device, server, routers going down during process in progress

Key Benefits:

- The engine logic is well documented and hence Softsmith is able to deliver it faster
- Test plans and data were similar and hence test documentation time and learning time was shorter
- The engine is generic and can send any data

Challenges Faced:

- Mocking the vessel environment and limiting the bandwidth to just hundreds of bytes was done thru custom stubs.
- Data synchronization after a connectivity loss and resuming from the last sent packet was a challenge.
- PDA compatibility took more effort than expected.