

Using TCP/IP and UDP/IP on the BGAN network

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This document gives recommendations for the use of applications based TCP/IP and UDP/IP, over the BGAN network, provides information on the performance of each protocol on a streaming IP data connection, and recommends how to configure your data connections and applications to maximize performance.

Recommendations

- Use a **Standard IP** data connection for **TCP** applications, for example e-mail and FTP.
- Use a **Streaming IP** data connection for **UDP** applications, for example video streaming and audio streaming.

About TCP/IP

TCP traffic is better suited to a Standard IP data connection.

TCP (Transmission Control Protocol) is used for normal Internet traffic and applications such as Web browsers, FTP and so on, where data delivery must be guaranteed. TCP/IP requires packet re-transmission, that is the re-sending of dropped or lost packets to ensure that all data is transmitted.

Packet retransmission is a standard feature on all networks running applications over TCP/IP. One result of this is the reduction in perceived IP throughput rates as the protocol waits for the re-transmission of dropped or lost packets. In addition, TCP/IP applications throttle their rate of packet transmission based on the capacity of the link. For these reasons, TCP is best suited to an IP connection optimized for packet re-transmission, and ideally with as large a capacity possible. Inmarsat recommends the **Standard IP** connection, with data rates of up to 492kbps, for TCP-based applications traffic over the BGAN network.

The characteristics of TCP/IP traffic are not as well suited to the **Streaming IP** connections available on the BGAN network. Each Streaming IP connection is a dedicated connection designed for a single IP packet stream at a fixed rate of throughput (up to 256kbps). The Streaming IP connection is better suited to time-critical applications, where rapid transmission of data is more important than dropped or lost packets. Such applications are better suited to the UDP protocol.

Should you decide to use **TCP/IP applications** over an **IP Streaming** data connection, you may experience the following:

- In the from-mobile direction, a typical 10-15% reduction in throughput due to network signalling and application overheads, plus a further 10-15% reduction based on TCP packet retransmission. The achieved IP throughput could therefore be up to 30% less than the desired Streaming rate.
- In the to-mobile direction, the affect on performance could be the same as the from-mobile direction. In addition, there is the risk of further dropped packets should data burst at a rate higher than the capacity of the connection. In this scenario, packets are repeatedly lost and re-transmitted until the BGAN link has the capacity to forward them to their destination. This may cause a further 10% reduction in throughput.

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About UDP/IP

UDP traffic is better suited to a Streaming IP data connection.

UDP (User Datagram Protocol) is used for applications such as video streaming or audio streaming, where lost packets don't need to be retransmitted and speed takes precedence. Unlike TCP/IP, any dropped or lost packets are ignored and compensated for or replaced by the application. This application intelligence optimizes transmission speeds, and is particularly effective on non-contended connections, such as **Streaming IP** connections on the BGAN network.

UDP applications throttle their transmission rate according to the capacity of the connection, but they do not retransmit packets. The achieved data rate is therefore much closer to the desired connection rate.

Inmarsat particularly recommends **Streaming IP** connections for live video and audio applications, which are better suited to the UDP protocol. Examples of such applications are Streambox and QuickLink.

Optimization and Tips

- Make sure that **end-to-end QoS** is supported for the required data rate.

This is particularly important for UDP-based applications running over Streaming IP connections on BGAN. To maintain throughput and quality it is important that QoS is maintained across the terrestrial 'last mile' link as well as the satellite interface.

If you want to use BGAN for live video and audio streaming traffic using UDP-based applications, Inmarsat recommends that you investigate and implement 'last mile' routing arrangements which guarantee end-to-end QoS. BGAN Distribution Partners and Service Providers can provide details of available interconnect options.

- In BGAN LaunchPad, always **set the Minimum data rate to the same as the Desired data rate**. This ensures that you are always allocated the data rate that you require.

To set the Minimum rate and the Desired rate to the same value, do the following in BGAN LaunchPad for each data connection:

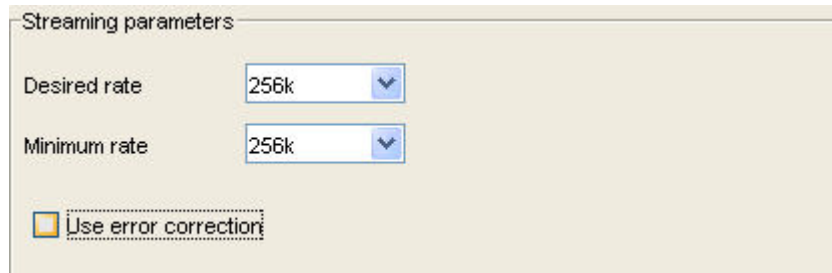
1. Select the **Data** tab, and right-click on the connection you want to edit.
2. Select **Edit**. The Connection Icon Setup dialog box displays.
3. Select the **Connection** tab.
4. Select the same data rate in each drop down box (shown below), and click on **OK**.

The screenshot shows a dialog box titled "Streaming parameters". It contains two dropdown menus: "Desired rate" and "Minimum rate", both of which are set to "256k". Below these is a checkbox labeled "Use error correction" which is currently unchecked.

- Turn **error correction off**. Error correction is not required by either protocol, because:
 - UDP does not require re-transmission.
 - TCP has re-transmission built-in.

To turn error correction off, do the following in BGAN LaunchPad for each data connection:

1. Select the **Data** tab, and right-click on the connection you want to edit.
2. Select **Edit**. The Connection Icon Setup dialog box displays.
3. Select the **Connection** tab.
4. Uncheck the Error correction check box (shown below), and click on **OK**.



- In order to minimize packet dropping generally, **set the maximum packet payload size to 1400 bytes**. You must set this for each application you want to use on a UDP/IP connection, for example Streambox. Refer to the documentation supplied with your application for details.