Shipping Industry Customer

Enhancing operational performance & service offerings

Background

The shipping industry has been plagued in a number of different ways over the past decade. First, overcapacity in number of available container slots has led to historically low freight rates. Second, the increased costs of bunker fuel and crew have forced shippers to run at very thin margins. Third, and most importantly, the amount of differentiation from one shipper to another has been minimal, creating a commoditized market in which the only difference in services is price.

A market-leading container shipping company characterized the Refrigerated container (Reefer) market as a burning platform in which increases in the costs associated with the service far outpaced the price a customer was willing to pay. Something had to change here and very urgently. The shipping company realized that improved operational efficiency and automation in the Reefer management process was required to reduce cost in delivering the service and to derive additional value for the end customer. After investigating various technologies including WiFi, Zigbee, RFID and Mobile Satellite Services (MSS), this shipping company concluded that GSM would be the best choice to enable machine to machine communication (M2M) and an always-connected Reefer container to help re-build a profitable business and to launch additional value added services.

The Challenge

Communication services to vessels have traditionally been viewed by many shipping companies as a cost center only, and not something that adds value to either internal or external stakeholders. Much of this mindset stems from a long history of costly and inadequate services offered by the Mobile Satellite Services industry that can only support a very limited range of applications, but are not suitable for today's business needs.

This particular shipping company had a recent generation MSS system already onboard, and wanted to re-use that investment if possible. However, after extensive trials and business case modeling, the shipping company concluded that the low performance in terms of lack of guaranteed bit rate, lacking quality of service, long and variable delay and high bandwidth costs, MSS would not be able to handle M2M traffic over GSM for a business critical service.

To enable a reliable and consistent M2M service using GSM, certain jitter and latency thresholds had to be met. In addition, this shipping company operated on an international scale and therefore, Reefers could end up on vessels anywhere on the globe, which posed an additional challenge. Analyses showed that the latency and jitter over the satellite link was crucial in the overall end-to-end delay budget.

Shipping Vessels   Teleports & Satellite Beams   Worldwide MPLS   Datacenter

End-to-End Delay Budget
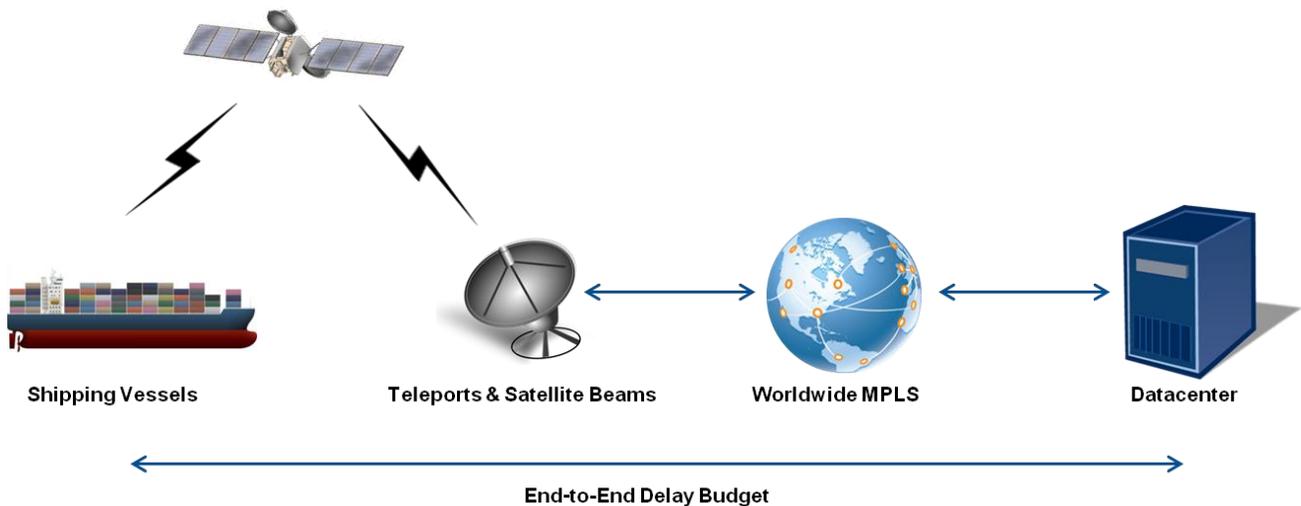
As a result of the number of hops within this chain, it was desirable to minimize the jitter and latency in the satellite link, which would provide the majority of both of these measurements. Furthermore, as the information and telemetry collected and transmitted from the M2M device in the Reefers was to be text-based, which is highly compressible, it was desirable to minimize the actual traffic that was sent over a satellite link, reinserting redundant or unimportant data on the other end of the link.

Solution

The shipping company considered two options to support this network, a dynamic SCPC solution from Comtech EF Data and a TDMA-based alternative.

After a thorough investigation along with their system integration partner, it became clear that a TDMA-based solution simply could not meet the delay and jitter requirements of the proposed GSM/VSAT solution. In addition, the lack of heavy duty payload and header compression to handle M2M traffic in a GSM environment lead to a need for 100% more satellite bandwidth in the TDMA-based system compared to the Comtech EF Data solution.

The Comtech EF Data solution is based on a shared outbound carrier and inbound carriers that dynamically manage bandwidth to a SCPC modem onboard the vessel. The dynamic bandwidth management system enables each remote modem to share bandwidth within a bandwidth pool in both directions of the link. Each remote modem leverages its own optimal modulation and coding method in both directions and therefore operates at maximum performance anywhere in the satellite beam. Most importantly for this type of dataflow, the end-to-end delay and jitter characteristics inherent within a SCPC solution were within the demanding thresholds of the underlying protocol.

From a an overall operating cost perspective, the multi-layer header and payload compression engine in the Comtech EF Data satellite modem enabled a significant reduction of the required bandwidth to handle the M2M traffic generated by up to 200,000 Reefers in the network. Quality of Service (QoS) levels were maintained using DiffServ to ensure that real-time and non real-time applications were able to share the bandwidth in the most effective and efficient manner.

Outcome

Today, this shipping company supports the largest maritime VSAT network in the world. Throughout the network, independent upon location, traffic is delivered well within the latency and jitter budget allowed by the GSM solution, and the Comtech EF Data compression engine delivers the M2M data effectively over the satellite network. Since the original implementation of the M2M solution, the shipping company has upgraded the VSAT system several times and has added additional bandwidth to provide business communication services such as video, voice, email and Intranet/Internet, as well as crew welfare services to attract and retain the best people in the industry. The flexible nature of the Comtech EF Data solution has enabled a smooth migration away from MSS and enabled the shipping company to enhance its operational performance and launch additional applications and services beyond the initial requirements. Today, the communication services to the vessels are no longer viewed as a cost center, but as an integral component to the business delivering additional values to both internal and external stakeholders.

For additional information, please contact us:
Email: sales@comtechefdata.com
Tel: +1.480.333.2200
Fax: +1.480.333.2540
Web: www.comtechefdata.com