

Connectivity at Sea that Makes Your Home Connection Jealous

Internet connectivity on cruise ships has historically been a bit on the slow side. And passengers used to the blazing speeds of their home and office connections might even consider that to be a generous characterization. On top of that the cost to the cruise passenger was often seen as outrageous as plans were typically sold by the minute. But we really shouldn't blame the cruise industry for the slow speeds at sea—after all it hasn't been at all easy to get internet onto a ship kilometers off the coast, and certainly not with a connection that was fast enough to watch HD videos, skype, tweet or download large file attachments. And until recently, customers actually *wanted* to get disconnected! "I want to leave it all behind" was the common refrain.

When the world wide web and email were novel technologies, this was fairly acceptable for most cruise passengers. Passengers were entirely understanding that getting a high-performing internet connection in the middle of the Caribbean or Mediterranean would be nearly impossible. To most it seemed like maybe an added convenience to be able to "check in" on a project at the office or events back home. But being essentially 100% cutoff from the outside world allowed passengers to focus on relaxation, and little else.

But fast forward to 2016, and this is the opposite of what customers want, and expect.

Today, people around the world want to be connected at all times, and they want that connection to be a big, fat pipe that lets them do anything they could do at home or the office. In this case, the IT community is a victim of its own success; they have created innovative technologies that make high-performance internet more or less pervasive. Consumers and enterprise users worldwide have high expectations, and don't care where they are and what sort of connectivity challenges might exist in that location. At sea, in the air, in the middle of the Sahara Desert, everyone wants to be connected... and fully connected.

But customer desires don't change the technological hurdles it takes to bring broadband connectivity for computers and mobile handsets to passengers cruising around the world's seas.

So to rise to the challenge, cruise lines are faced with the task of finding the right technology solutions for enabling broadband-speed connectivity at sea. And while that task may be daunting, the benefits to cruise operators are numerous, profitable, and—as competitors roll out services on their ships—increasingly necessary.

The most obvious benefit derived from the improvement of internet connectivity on ships is the corresponding rise in customer satisfaction. Instead of having passengers hunt down an onboard Wi-Fi hotspot—and then pay a king's ransom for the privilege of sending a few emails—cruise operators are finding they can greatly improve the customer experience, while at the same time increasing revenues, by making internet accessible everywhere.

Better connectivity also enables cruise operators to attract new passengers that might not have previously considered going on a cruise. Consider that some families don't want to leave their kids and extended families—who never want to be disconnected—at home, so those potential passengers may

be lost without good onboard internet. And how many potential passengers have been reluctant to be disconnected from work for long periods for fear they might miss a vital meeting or project deadline?

The cruise industry is also seeing the potential to open up entirely untapped—and potentially very profitable—new customer groups by offering broadband internet service. Resort cities such as Las Vegas and Macau have long been favorite gathering places for corporate conferences and events, but this lucrative market was simply not available to cruise operators. Even though they essentially manage floating resorts that would otherwise be optimal facilities for such a gathering, the lack of connectivity disqualified the vessels as a suitable venue. But now with high-speed internet, corporations can live stream on and off the ship, employees can keep up with email and cloud-based applications, and the overall connected experience is identical to that at any onshore resort—but with all of the added allure of floating in the middle of the ocean.

Additionally, for all types of passengers, cruise operators with broadband connectivity are seeing a surge in overall internet usage, and corresponding revenues. Passengers are using Facebook, Snapchat, Facetiming and Skyping with friends and colleagues, playing online games, and keeping up with their favorite shows on Netflix, Hulu and Amazon. And the further benefit many of these apps provide to the cruise line is powerful, word-of-mouth marketing. There is no better way to say “wish you were here” than a photo or live video, sent to friends and family, from the deck of a ship overlooking the crystal blue waters of paradise.

And cruise lines that have implemented high-speed internet connectivity have been able to provide additional services for their passengers, including onboard real-time gaming centres. In this age where passengers love being fully connected, these are vital for raising the bar on the customer experience, and are good opportunities for cruise lines to bring in additional revenues.

And the benefits extend beyond benefits to the passengers. Onboard crew is a major user of internet connectivity, both for official corporate communications, as well as keeping in touch with friends and family on the mainland. The early adopters of high speed internet at sea have discovered a definite advantage in attracting and retaining quality staff through improved Crew Welfare.

With the right technology solution, cruise industry IT groups can consolidate their infrastructure, including the extensive hardware requirements on board each ship. The ability to keep much of the processing power and digital information needed for a ship’s systems off the ship and on the cloud, can free up valuable onboard real estate for other uses. At the same time the IT staff needed aboard the ship to look after the servers is also lowered, further reducing operating costs for the cruise line operator.

But while the benefits to implementing first-rate connectivity for in a maritime environment are quite apparent, the challenges in delivering the service to passengers and crew are very real, and quite complex.

Cruise operators have some of the most advanced IT departments in the world, and for good reason—they have to overcome unique challenges their land-based counterparts in generally don’t encounter. Hooking a ship up to the internet backbone via a fiber cable is, of course, impossible unless they are docked in a port or close to terrestrial land connectivity. So satellite is the only option to connect. Ships are constantly cruising, turning and swaying, so they require tracking antennas that can hold on to the

signals of either stationary or moving satellites, adding complexity to the antenna engineering. Also, a ship is essentially a series of metal walls and floors—not at all the ideal environment for a good, strong Wi-Fi signal.

Fortunately, new technologies have been developed over the past several years which have vastly improved connectivity for ships. Since all internet to ships at sea is delivered via satellite, the most important technological advances would obviously come from the recent evolution of satellite systems. An entirely new breed of satellite systems, such as the O3b Networks satellite constellation, provide never before seen capabilities, unfathomable for satellites just a few years ago:

- High throughput – high throughput satellites, referred to as HTS satellites, are capable of broadband-like connectivity which is a requirement for the large amounts of data used by modern applications. Anyone who can recall trying to download a small photo across your old modem connection will appreciate that high throughput is necessary for the endless high resolution photos and ultra HD videos passengers want to post of their voyage.
- Low latency – latency is best described as the lag time for data to traverse a network from start to finish. When latency gets too high, many applications—especially cloud-based and database-driven applications—no longer function because the signal "times out" before enough data can get through the network. A traditional geosynchronous (GEO) satellite, like those the cruise industry has relied upon for many years—has a latency of greater than 500ms. That's long enough to be noticeable in a phone conversation, and renders some applications unusable. However, new satellites that operate at a lower altitude, such as O3b, have a latency of less than 150ms which is actually comparable to long-haul fiber. With lower lag time over satellites, any latency-sensitive applications you can use at home, you can now use on your next cruise.
- Steerable beams – HTS satellites have smaller coverage areas than traditional GEO satellites, so as a ship is moving it's possible that at some point it will cruise out of the coverage area. For this reason, some satellites operators built their systems with steerable beams, so the coverage area actually moves with the ship, and the signal is never lost.

But beyond the satellite system improvements bringing high throughput, low latency and steerable beams, there are many improvements cruise line operators are making onboard the actual ships, resulting in further improvements to internet performance for passengers and crew. Innovations in data compression and caching are making an enormous difference for a variety of web-based applications. Compression technologies use sophisticated, proprietary algorithms to shrink a string of data down to its minimum file size, then intelligently decompresses the data to the original state upon delivery to the ship. Caching intelligently examines content that is being frequently requested—web pages, images, videos, etc.—and then stores that locally in the cache server so it can quickly serve it up the next time it is requested, rather than traversing the path to the satellite and back to earth each time the same request is made. And the great news is that while caching, compression and other acceleration technologies greatly enhance the experience of many applications even over a GEO satellite link, the improvements are just as beneficial over an already superior HTS connection.

So the future of the internet at sea, for both regional and global cruise line operators, is quite clearly full connectivity, with little to no noticeable difference from being on land. This means good things for different a people on the cruise lines. For passengers it means a better overall user experience, keeping in touch with friends and family on shore, and being able to go on vacation when they might not otherwise have had the chance. For crewmembers, better internet means improved efficiency and

productivity at work, their loved ones back home won't feel so far away, and overall they'll enjoy a better quality of life while working at sea.

And for the cruise line operators themselves, the future essentially means happier passengers, new profit centers, and new capabilities. High throughput, low latency connectivity enables a myriad of Internet of Things (IOT) technologies which have the potential to revolutionise how cruise ships function. Superior connectivity also opens up new potential markets, such as corporate retreats, previously impossible with slow internet.

And better connectivity at sea will not only benefit leisure travelers on large crew ships, but has the potential to bring a better experience for a wide array of maritime travelers. Passengers on smaller cruise ships, yachts, personal boats and crews of commercial shipping vessels will also benefit from this trend immensely before long.

It's truly the best time in history to take book passage on a cruise liner. The amenities being offered are simply amazing, and cruise line operators are going to great lengths to provide the best experience possible in order to cement life-long bonds with loyal customers. And an increasingly large part of that experience is making sure the internet connection is as good, and in many cases now even better, than what they left on shore. Passengers no longer want to "leave it all behind," but instead now see connectivity as enabling the time away they may not have been able to justify without it. In fact, it is no surprise for a crew-member aboard a broadband-connected ship to hear a child ask her parent why they can't get better internet at home, "just like the ship?"