IP Multicast Guide

In smaller networks, the way that the network communicates between the central components, such as the Network Manager, and remote Player is with standard Internet protocols such as FTP. In larger networks, and especially with larger content such as MPEG2 files, standard FTP transmissions can be very inefficient - having each player pull its content individually from a central FTP server. Imagine 1,000 players each trying to pull 1 gigabyte of content from a single Network Manager server, more or less at the same time. That is a lot of data, especially at the central point.

The best solution would allow you to communicate with those 1,000 Players by sending content JUST ONCE. That's the power of IP Multicast. Innov8 Solutions has deployed many Scala **www.scala.com** based networks using Multicast Technology. Scala's software scales from 10 players to 10,000 players seamlessly.

The Public Internet does not support IP Multicast. Typically most satellite providers DO support multicast, and in fact, prefer multicast transmissions.

As your digital signage network expands into hundreds or thousands of remote sites, it may become time to consider one of the three multicast technologies currently available. These are:

- Dedicated Satellite Multicast Bandwidth
- Shared Satellite Multicast Delivery
- Terrestrial IP Multicast

Installing a 256Kbps Frame Relay connection or even a relatively cheap DSL circuit to each player location, assuming you can even get DSL service in all locations, can really add up when it comes to your monthly commutations bill. By using IP multicast technology on your 1,000-unit network, your price per site per month can be a fraction of a cheap DSL circuit and it has a ubiquitous footprint.

There are three main ways to communicate via multicast. The most common is a dedicated satellite multicast subscription, which is supported by all major satellite bandwidth providers including Hughes Network Systems, Spacenet (Gilat), and GlobeCast.

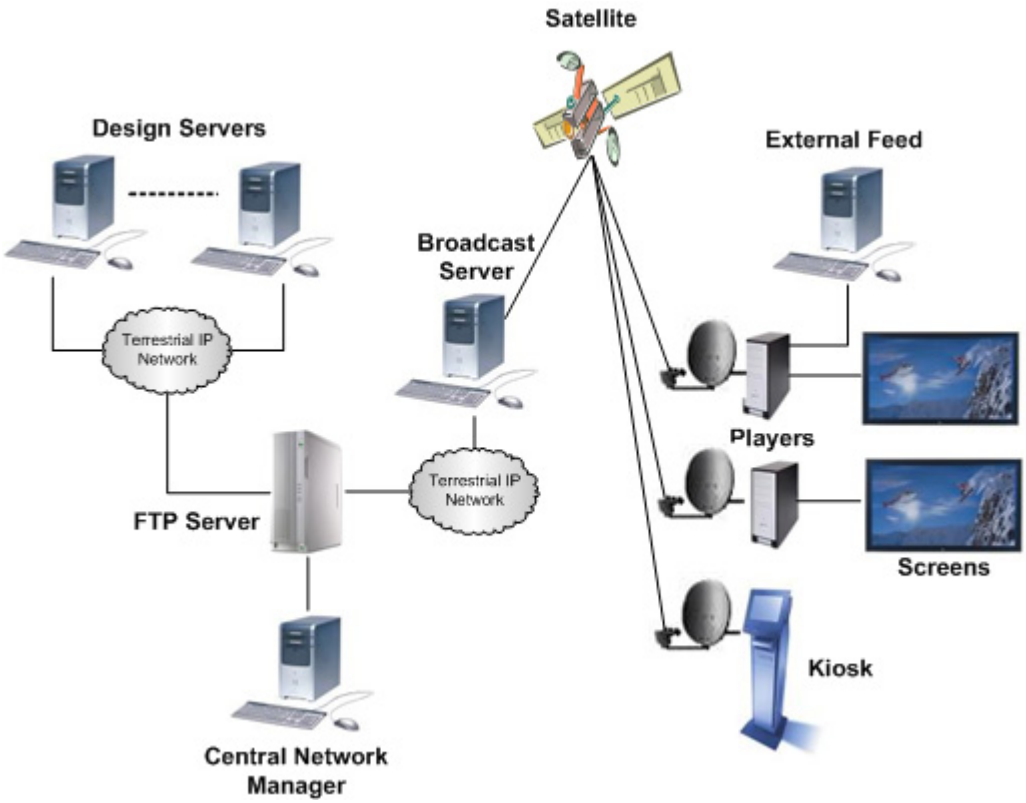
Innov8 has vast experience of the Hughes' DIRECWAY® **www.hnseu.com** multicast delivery system. With Hughes, your costs can be significantly lower for the smaller network with infrequent, but larger updates. Most of our larger customers use this method today.

A third alternative is terrestrial IP multicast. This is offered by many major ISPs and telecom companies such as BT, Cable & Wireless and others. This is not very common,

but if all of your locations are within the same "cloud", it is possible for the network operator to enable multicast data over your network.

Dedicated Satellite Multicast

The diagram below explains satellite multicast, where the Central Network Manager sends its data to a Broadcast Server for direct transmission to the satellite uplink. This assumes that you have purchased dedicated bandwidth from a specific satellite service provider on a 24/7 basis. This is usually in the 1 to 3Mbps range. You will need to either co-locate your broadcast server at your satellite provider's location, or you must have a backhaul connection into their NOC for this to work. Dedicated bandwidth means customers will pay for the same bandwidth regardless of how much that they use.



Organizations that already have a satellite network in place may be able to share bandwidth with other applications during "slow times", or you can also add additional bandwidth fairly easily.

Customers have three choices in where to host the Broadcast Server. First, and most popular, is by collocation. Similar to web hosting, companies often purchase or rent an entire FTP server on-site at the satellite provider that controls their transmissions. Secondly, the Broadcast Server could be located on YOUR premises, if you are able to provide a backhaul circuit to the NOC. This can become quite expensive depending on how close you live to your NOC.

Remote sites require their own small dishes and satellite modems.

DIRECWAY Multicast Delivery (formerly known as "package delivery")

Package delivery can be a cost-effective way to transmit occasional data by paying per megabyte without a monthly subscription. Customers should make sure to think this option through before proceeding because there is a crossover point where package delivery becomes more expensive, and thus many customers would rather have their own dedicated bandwidth instead.

Innov8 operates many networks where the satellite infrastructure is provided by Hughes Network systems who offer a ‘Direcway’ Service. Hughes host an intermediary server which queues up any content it receives to be sent in the order it was received (unless you've paid for High Priority Service). Therefore, in this model, the Broadcast Server is always set up at the customer's location and often on the same computer as the Central Network Manager. Since everything is set in a queue, content is not sent immediately but in general is sent within a few minutes of being uploaded to Hughes. The downlink is usually between 1 and 3 Mbps.

Remote sites work mostly the same way as in satellite multicast.

Terrestrial IP Multicast

Standard Ethernet cards produced in the past decade have been capable of multicast transmissions. The reason for the slow adoption rate is because to have a private multicast network, all the segments through the entire data path (via both Intranet and Internet) must be multicast-compatible. The public Internet is not the best network for reliable, real-time, streaming. For large organizations, it can be just as difficult to enable multicast internally with IT staff as well as externally through an Internet Service Provider.

The advantage of terrestrial IP multicast is that it requires no additional hardware and requires little, if any, extra infrastructure.