Enabling TelCos to Do More with Less

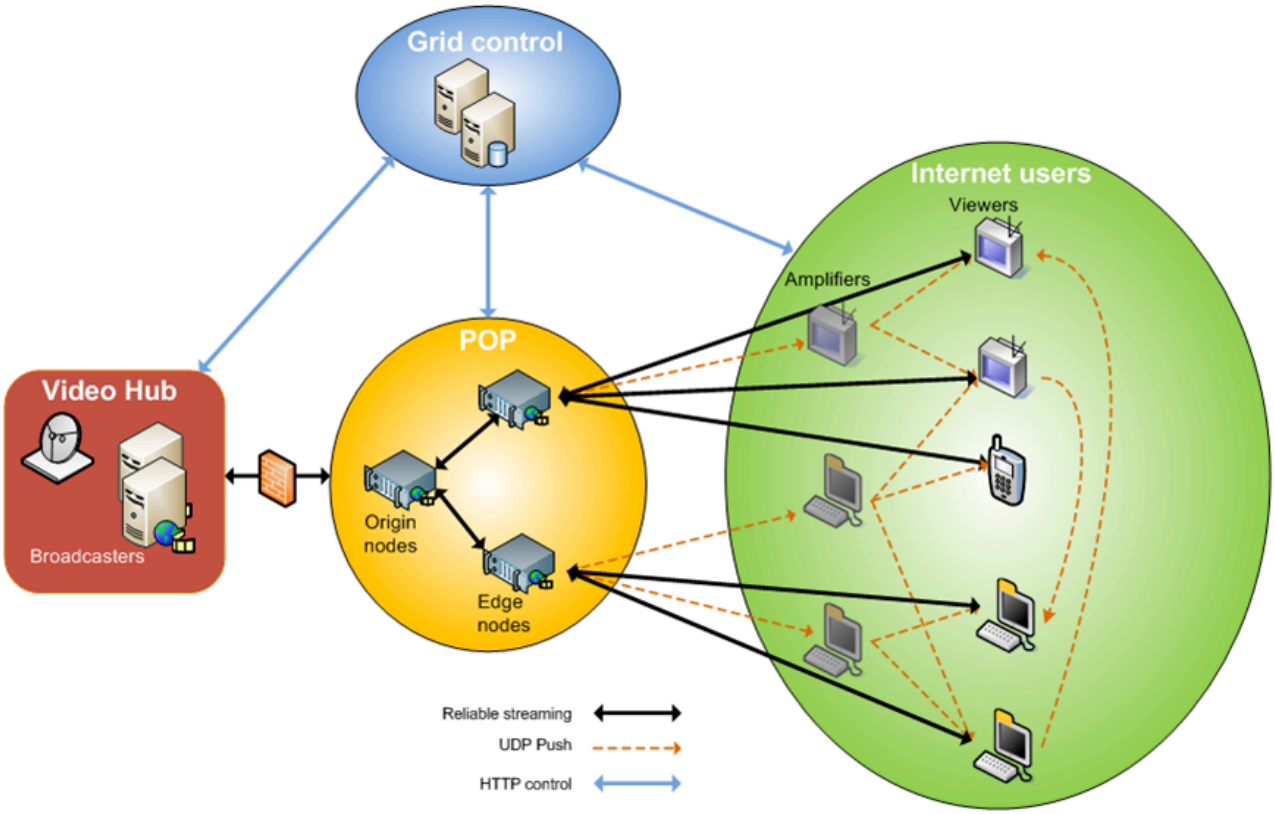
With the advances in high-speed Web technologies in recent years, TelCos have begun offering high-quality, Web-based TV services. Existing infrastructures have been able, at best, to support a few million customers. As the demand continues to increase, as well as the sophistication of the services demanded, the limitations of these infrastructures are becoming increasingly clear, and their costs are becoming prohibitive.

The RayV Solution

The RayV content distribution solution enables TelCos to provide the high-quality, reliable services their customers expect at a fraction of the cost of other solutions, to all platforms (set-top boxes, PCs, tablet PCs, and mobile devices).

This is achieved by several unique RayV innovations:

- Leveraging Peer Resources – Cuts costs and enables better scaling.
- Grid management – Ensures optimally efficient resource management according to Telco policies.
- Algorithms for Optimally Efficient Packet Distribution – Prevents data packet rarity and bottlenecks.
- Dedicated Nodes – Centralized in POPs to guarantee SLA.



RAYV

Leveraging Peer Resources

In a simple Unicast system, each dedicated server can broadcast a high-quality data stream to only a few hundred viewers. As the number of viewers increases, the number of servers must increase linearly.

Using Peer Data Sharing infrastructure, RayV leverages the spare bandwidth of active peers to spread the data stream to other peers in the system, dramatically reducing the demand for dedicated server resources.

Furthermore, RayV leverages the spare download and upload resources of idle peers, called Amplifiers, to distribute the data stream. This overcomes the problem of network asymmetry, and ensures ample bandwidth for meeting the needs of all viewers.

With a current peer network consisting of approximately 5 million peers, RayV's ability to supplement data distribution results in a need for up to 90% fewer dedicated servers, translating to 90% lower operation and maintenance costs.

Grid management

Rather than merely rely on random resource distribution among the various peers, the RayV Grid Service constantly monitors resource usage and availability to enable optimally efficient resource distribution across the network.

Network topology is taken into account to ensure that nearby resources are leveraged before more distant resources, guaranteeing high scalability, and maximizing the quality and efficiency of data distribution while minimizing data routing time.

Furthermore, the Grid Service manages security by implementing authorization protocols, and maintains detailed logs of resource usage and viewer activity for analytics and billing purposes.

Algorithms for Optimally Efficient Packet Distribution

One of the problems that plagued early Peer Data Sharing infrastructures was packet distribution imbalance. In the process of distributing data packets among peers, if critical packets became rare (due to network bottlenecks), all peers suffered. Solutions have been developed for this, but none of them are applicable for the unique demands of live-streaming.

RayV uses specialized Priority Encoding Technique algorithms, utilizing advanced information theory applications, to solve this problem. RayV divides each piece of data into distinct sets of packets. When copies of these packets are distributed throughout the network, any viewer that receives the original number of packets, regardless of which specific packets, is able to reconstruct the original data.

For example: RayV's algorithm divides a video segment into 50 discrete data packets, each being one MTU in size. The video segment is broadcast to a network of 10,000 Amplifiers. Each Amplifier receives only one of the 50 packets, and passes that packet along to other peers. Due to the nature of RayV's unique algorithm, after a viewer has received any set of 50 packets, the viewer is able to reconstruct the original video segment. This is true regardless of which specific data packets were received, or from which peers the packets were received.

Furthermore, in a situation where a peer is unable to receive one or more packets from other peers, it can request the specific missing packets from a dedicated node to complete the original data segment.

For RayV, the problem of packet rarity is practically nonexistent.

Dedicated Nodes

Peer Data Sharing infrastructure alone is excellent for resource management, but it can be unreliable. RayV's network supplements Peer Data Sharing with dedicated nodes which not only provide the initial data stream to the peer cloud for distribution, but are also arranged to supplement any lack of data at the end viewers, ensuring high Quality of Service for your customers at all times.