

# Overlay Networking Architecture

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The current Internet has been initially designed around 1973 by Vinton Cerf and Robert Kahn. Though the architectural design has taken into account the scalability of the network, by the concept of networking of networking, it would not consider the overlay networking, i.e., the network would be a single plane for global scale. The Internet was a overlay network over telephone network, such as PSTN or SONET/SDH/PDH. However, from the view point of layer 3 networking, it has been so called "peer-model" architecture.

First intensive discussion regarding the overlay networking with TCP/IP framework would be when we have discussed about label switching technology, i.e., MPLS (Multi-Protocol Label Switching) technology. There had been the discussion on overlay-model versus peer-model architecture. After the intensive discussions, MPLS has been basically adopted "peer-model".

Recent years, we have a lot of discussion and implementation on so-called "overlay networking", which may include peer-to-peer networking. The overlay networking can be defined as the independent network virtually constructed over the legacy layer 3 IP network. With this consideration, the peer-to-peer networks, such as file sharing system, can be of overlay network.

In this presentation, the author discusses about two technical challenges on overlay networking. One is on distributed data management in overlay networks, and the other is management of global routing information and connectivity in overlay networks. Without taking into account these technical points and without solving these technical challenges, the scalable "global" scale overlay networks will not be able to deploy, practically. The author may suggest two possible architectural paradigms; one is the separation of routing information and node identifier, and the other is to apply peer-model to achieve better flow control functions and transparent caching for distributed data management. Also, IRIDES architectural framework based on this discussion is discussed in this presentation.

## References

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